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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:

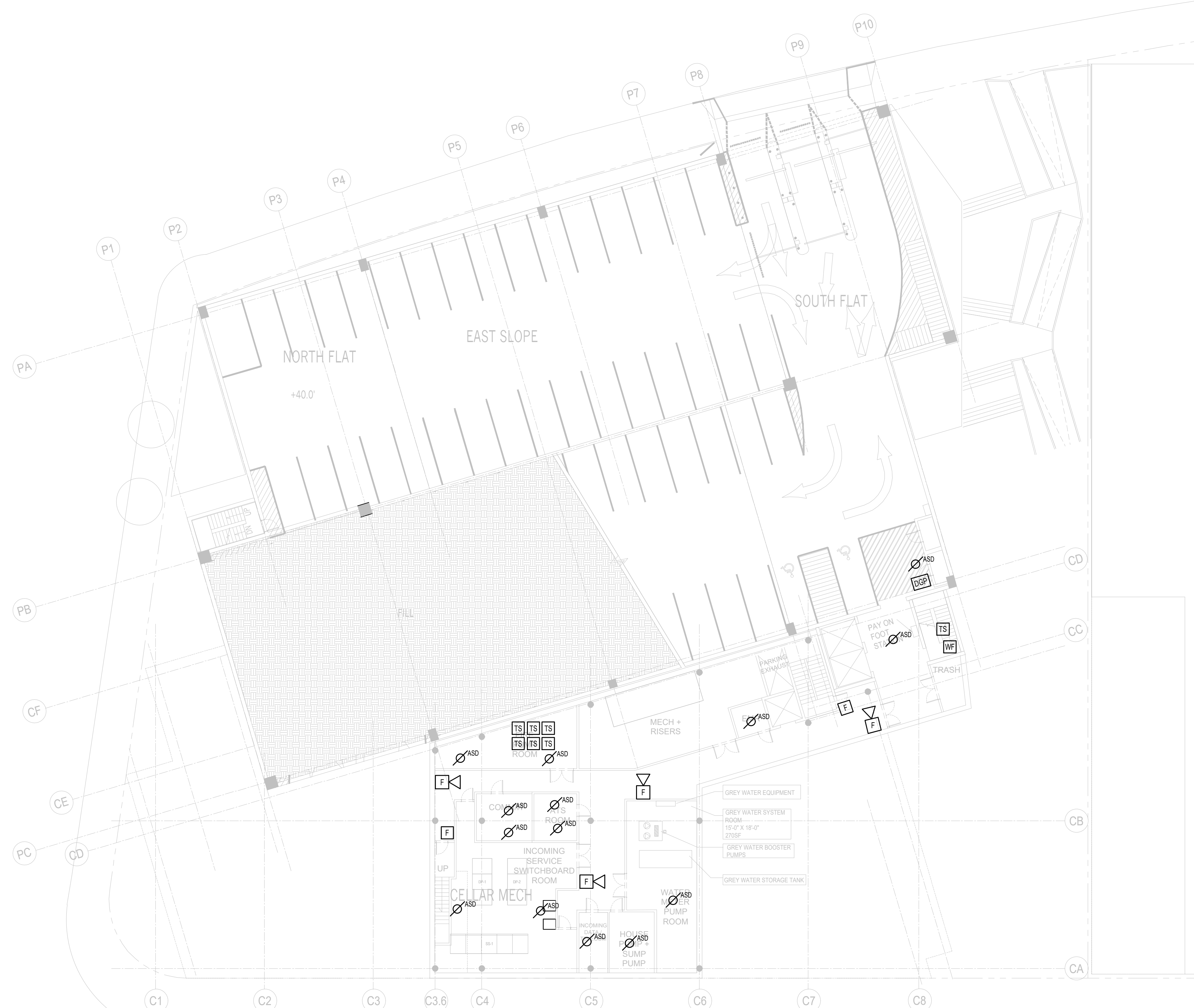
PROJECT NORTH

DRAWING TITLE:  
**FIRE ALARM CELLAR LEVEL**

SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**FA-100**  
DRAWING ORDER: 140 of 205



**01** CELLAR LEVEL  
1/16" = 1'-0"

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**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:

PROJECT NORTH

DRAWING TITLE:  
**FIRE ALARM PLAN  
FIRST FLOOR**

SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**FA-101**

DRAWING ORDER: 141 of 205



**01** FIRST FLOOR PLAN  
1/16" = 1'-0"

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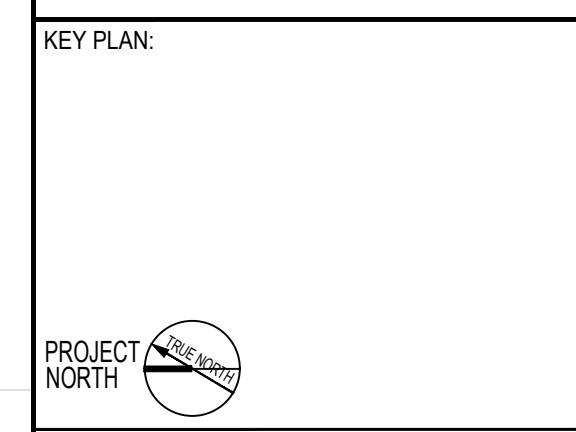
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**TECHNICAL DRAWINGS**

KEY PLAN:



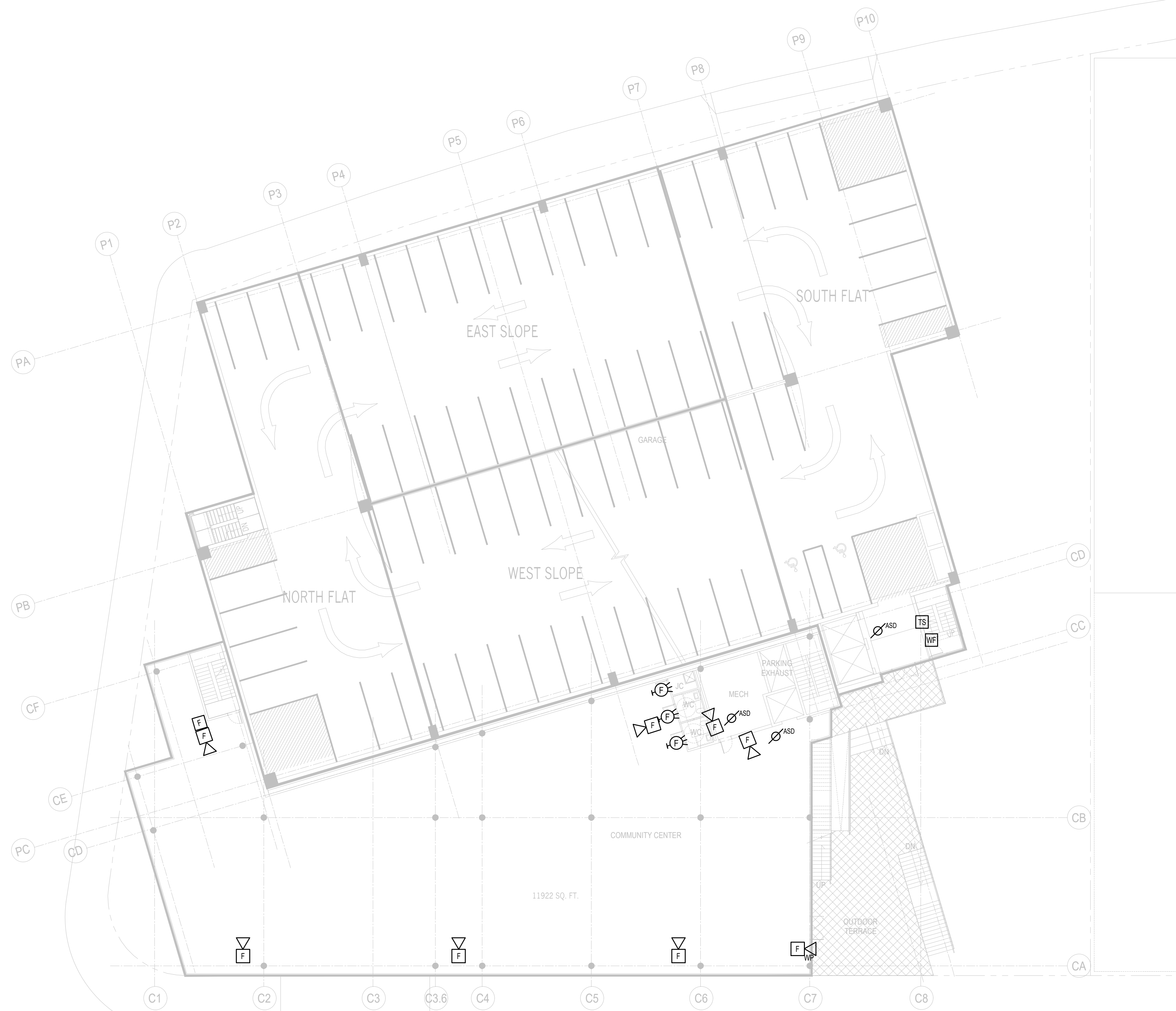
PROJECT NORTH 

DRAWING TITLE:  
**FIRE ALARM PLAN  
SECOND FLOOR**


SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**FA-102**  
DRAWING ORDER: 142 of 205



**01** SECOND FLOOR PLAN  
1/16" = 1'-0"

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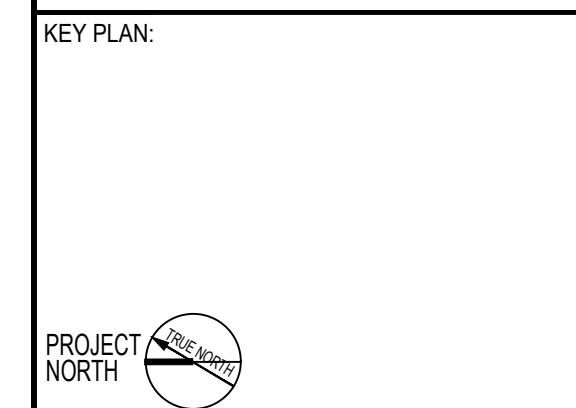
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**TECHNICAL DRAWINGS**

KEY PLAN:  


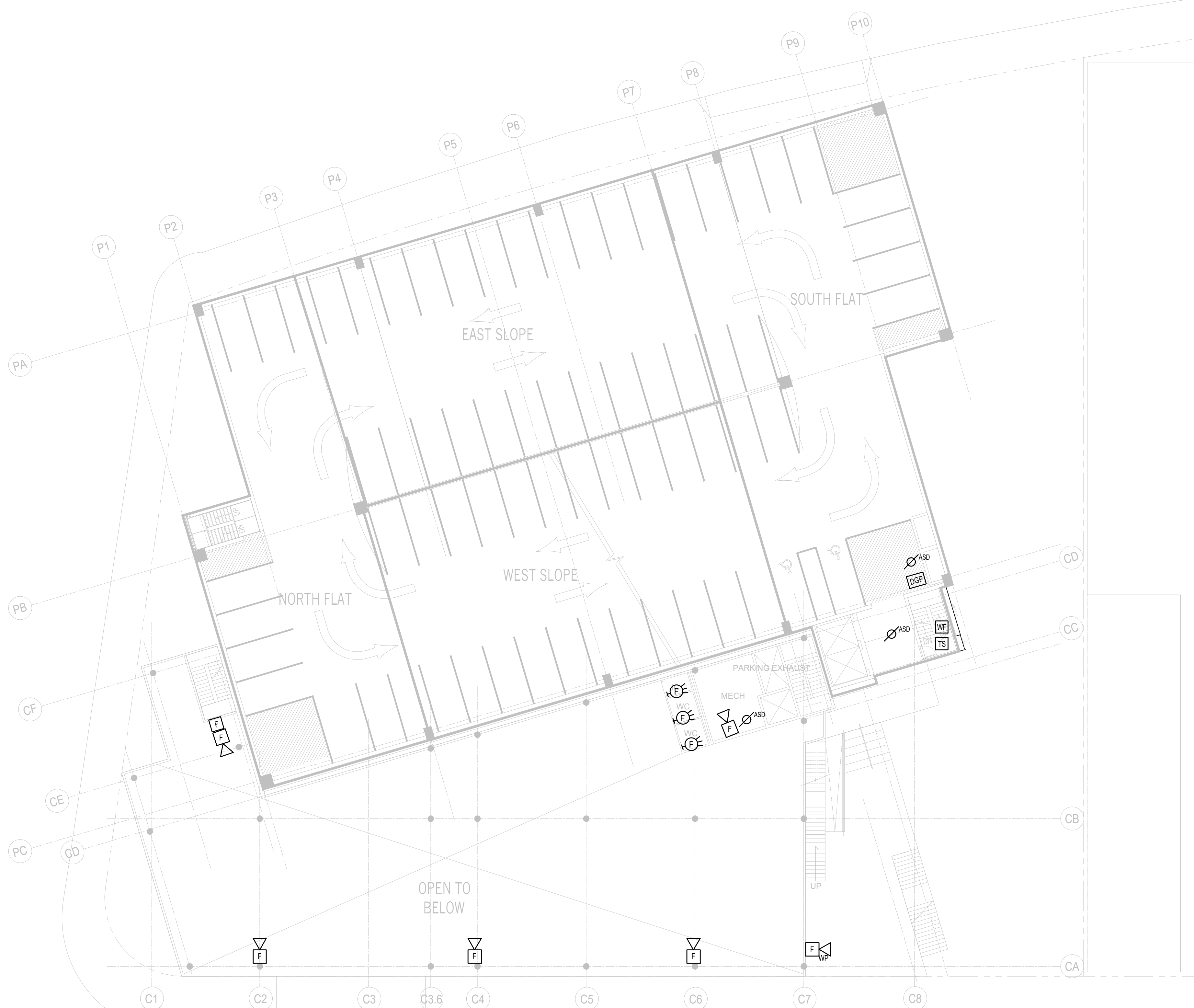
PROJECT NORTH   
DRAWING TITLE:  
**FIRE ALARM PLAN  
THIRD FLOOR**

SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**FA-103**

DRAWING ORDER: 143 of 205



**01** THIRD FLOOR PLAN  
1/16" = 1'-0"

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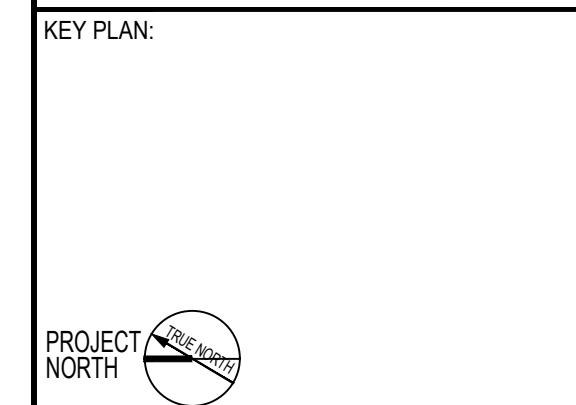
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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
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**TECHNICAL DRAWINGS**

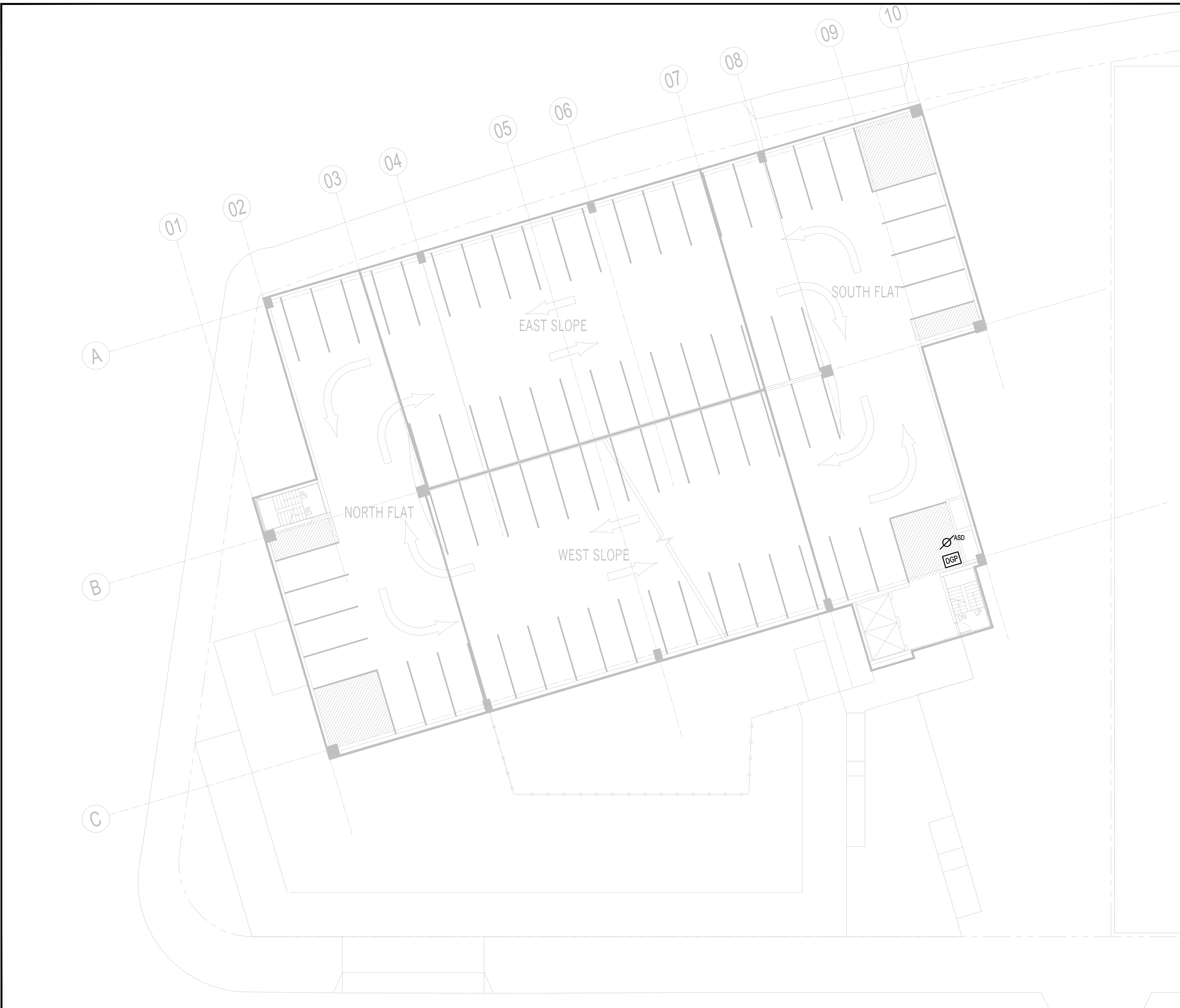
KEY PLAN:  


PROJECT NORTH   
DRAWING TITLE:  
**FIRE ALARM PLAN  
SIXTH FLOOR**

SCALE: AS NOTED DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**FA-106**  
DRAWING ORDER: 144 of 205



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**QUEENS GARAGE & COMMUNITY SPACE**  
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Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:

PROJECT NORTH

DRAWING TITLE:  
**FIRE ALARM RISER DIAGRAM**

SCALE: NONE DATE: SEPTEMBER 18, 2020

SEAL:

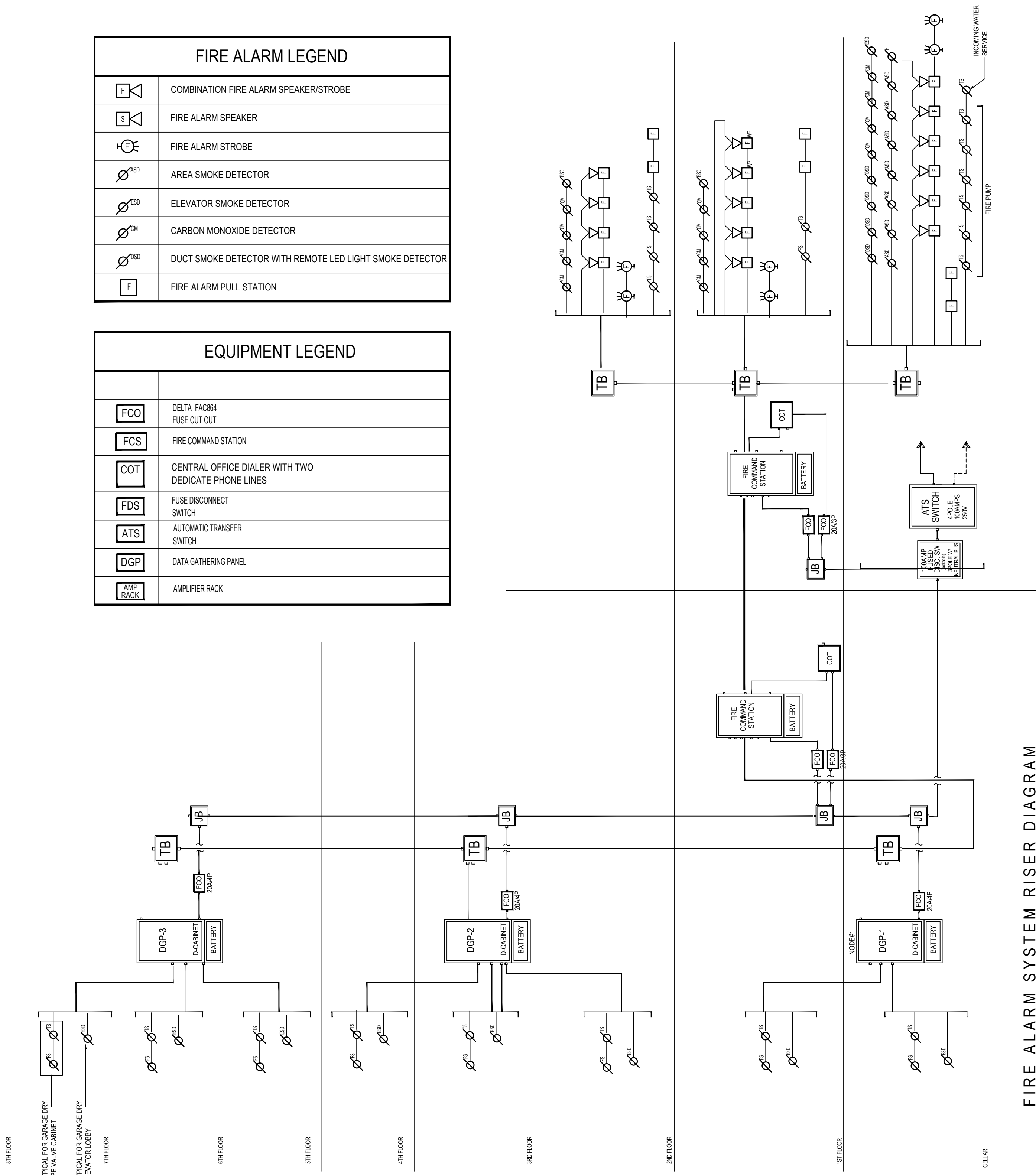
DRAWING NUMBER:  
**FA-300**  
DRAWING ORDER: 145 of 205

**FIRE ALARM LEGEND**

	COMBINATION FIRE ALARM SPEAKER/STROBE
	FIRE ALARM SPEAKER
	FIRE ALARM STROBE
	AREA SMOKE DETECTOR
	ELEVATOR SMOKE DETECTOR
	CARBON MONOXIDE DETECTOR
	DUCT SMOKE DETECTOR WITH REMOTE LED LIGHT SMOKE DETECTOR
	FIRE ALARM PULL STATION

**EQUIPMENT LEGEND**

	DELTA FAC884 FUSE CUT OUT
	FIRE COMMAND STATION
	CENTRAL OFFICE DIALER WITH TWO DEDICATE PHONE LINES
	FUSE DISCONNECT SWITCH
	AUTOMATIC TRANSFER SWITCH
	DATA GATHERING PANEL
	AMPLIFIER RACK



**FIRE ALARM SYSTEM RISER DIAGRAM**

**PLUMBING BASIC SYMBOLS**

(NOT ALL SYMBOLS AND ABBREVIATIONS ARE APPLICABLE TO THIS PROJECT)

	SOIL, WASTE OR SANITARY PIPING
	VENT PIPING
	DOMESTIC COLD WATER PIPING
	DOMESTIC HOT WATER PIPING
	ARROW INDICATES DIRECTION OF FLOW
	3/4" HOSE BIBB
	CLEAN OUT/PLUGGED OUTLET
	CAPPED OUTLET
	CLEAN-OUT DECK PLATE
	P-TRAP
	PIPE DOWN/DROP
	PIPE UP/RISE
	UNION
	REDUCER
	PRESSURE GAUGE
	THERMOMETER
	TRAP PRIMER
	WATER HAMMER ARRESTOR
	WATER PROOF SLEEVE
	FLOOR DRAIN
	PUMP
	SUB WATER METER
	P-TRAP
	TEMPERATURE AND PRESSURE RELIEF VALVE
	MIXING VALVE
	BALL VALVE
	CHECK VALVE
	RISER DESIGNATION RISER SERVICE RISER NUMBER

**PLUMBING ABBREVIATIONS**

BV	BALL VALVE
BLDG	BUILDING
CLG	CEILING
CO	CLEANOUT
COOP	CLEANOUT DECK PLATE
CONN	CONNECTION
CW	COLD WATER
DN	DOWN (PENETRATES FLOOR SLAB)
FD	FLOOR DRAIN
HB	HOSE BIBB
HW	HOT WATER
LAV	LAVATORY
MV	MIXING VALVE
MS	MOP SINK
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NTS	NOT TO SCALE
SAN	SANITARY
SH	SHOWER
MR	MOP RECEPTOR
SK	SINK
TP	TRAP PRIMER
TP	TYPICAL
UP	UP (PENETRATES FLOOR SLAB)
UR	URINAL
VB	VACUUM BREAKER
V	VENT
W	WASTE
WC	WATER CLOSET
WHA	WATER HAMMER ARRESTOR

**NYC 2014 NOTES:**

- GENERAL NOTES, SYMBOLS LIST, ABBREVIATIONS AND DETAILS ARE APPLICABLE TO ALL PLUMBING DRAWINGS.
- DRAWINGS ARE DIAGRAMMATIC. DETERMINE EXACT LOCATIONS OF SYSTEMS, EQUIPMENT AND COMPONENTS IN FIELD, ETC.
- THE PLUMBING SECTIONS OF THESE DRAWINGS AND THE SPECIFICATIONS MUST BE READ IN CONJUNCTION WITH EACH OTHER PRIOR TO BID AND CONSTRUCTION OF THIS PROJECT. ALL ARE CONSIDERED ONE DOCUMENT.
- ALL PLUMBING WORK SHALL BE IN STRICT ACCORDANCE WITH NEW YORK CITY BUILDING CODE 2014 EDITIONS.
- CONTRACTOR SHALL NOT INTERRUPT ANY OF THE SERVICES OF THE PUBLIC UTILITY SERVICES TO WHICH HE WILL CONNECT WITHOUT THE EXPRESSED PERMISSION OF CITY AGENCIES. SUCH INTERRUPTIONS AND INTERFERENCES SHALL BE MADE AS BRIEF AS POSSIBLE AND ONLY AT THE APPROVED TIME BY THE OWNER.
- SANITARY DRAINAGE AND VENT PIPING, UNLESS OTHERWISE NOTED, TO BE CAST IRON HUB AND SPIGOT PUSH CASKETED SOIL PIPE AND FITTINGS OR GALVANIZED STEEL PIPE WITH THREADED CAST IRON FITTINGS, OR CAST IRON NO-HUB (ONLY ABOVE GROUND LOCATIONS) WITH STAINLESS STEEL COUPLINGS FOR VENT AND MG CAST IRON COUPLINGS OR CLAMP-ALL STAINLESS STEEL COUPLINGS FOR SANITARY DRAINAGE PIPE. PIPE AND FITTINGS SHALL BE MARKED WITH COLLECTIVE TRADEMARK OF THE CAST IRON SOIL PIPE INSTITUTE.
- CHANGES IN DIRECTION IN DRAINAGE PIPING SHALL BE MADE BY THE APPROPRIATE USE OF 45 DEGREE WYES, LONG SWEEPS, SHORT SWEEPS, SIXTH, QUARTER, EIGHTH OR SIXTEENTH BENDS, OR BY A COMBINATION OF THESE OR EQUIVALENT FITTINGS.
- SANITARY TEES AND QUARTER BENDS MAY BE USED IN DRAINAGE LINES ONLY WHERE THE DIRECTION OF FLOW IS FROM THE HORIZONTAL TO THE VERTICAL.
- SHORT SWEEPS WILL BE PERMITTED IN DRAINAGE PIPING 3" IN DIAMETER OR LARGER FOR ANY OFFSETS EITHER HORIZONTAL OR VERTICAL.
- CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS, FEES, INSPECTION AND TESTS.
- ALL EXCAVATION AND BACKFILL AS REQUIRED FOR THIS PHASE OF CONSTRUCTION SHALL BE A PART OF THIS CONTRACT.
- ALL WORK SHALL BE PERFORMED BY A LICENSED PLUMBING CONTRACTOR IN A FIRST CLASS, WORKMANLIKE MANNER. THE COMPLETED SYSTEM SHALL BE FULLY OPERATIVE.
- ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT BUILDING CODE AND PLUMBING CODE AND ALL APPLICABLE LOCAL CODES, RULES AND ORDINANCES.
- NO WORK SHALL BE INSTALLED IN VIOLATION OF ANY GOVERNING CODES. ANY WORK SHOWN ON THE DRAWINGS WHICH IS IN VIOLATION OF SUCH CODES SHALL BE BROUGHT TO THE ATTENTION OF THE CONSTRUCTION MANAGER AND THE OWNER'S REPRESENTATIVE AND SHALL BE RESOLVED PRIOR TO THE INSTALLATION OF THE WORK INVOLVED.
- IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO COORDINATE HIS WORK WITH THAT OF ALL OTHER TRADES, INCLUDING (BUT NOT LIMITED TO), ELECTRICAL, HVAC, STRUCTURAL AND GENERAL CONTRACTOR. REPORT ANY DISCREPANCY TO ENGINEER/ARCHITECT PRIOR TO BEGINNING CONSTRUCTION.
- DAMAGED PIPING SHALL NOT BE REPAIRED AND/OR REUSED.
- ALL MATERIAL SHALL BE NEW.
- CONTRACTOR SHALL GUARANTEE ALL MATERIALS AND WORKMANSHIP FREE FROM DEFECTS FOR A PERIOD OF NOT LESS THAN ONE (1) YEAR FROM DATE OF ACCEPTANCE BY OWNER. CORRECTION OF ANY DEFECTS SHALL BE COMPLETED WITHOUT ADDITIONAL CHARGE AND SHALL INCLUDE REPLACEMENT OR REPAIR OF ANY OTHER PHASE OF THE INSTALLATION WHICH MAY HAVE BEEN DAMAGED.
- HOT & COLD WATER PIPES, STORM DRAIN PIPING SHALL IDENTIFICATION AND FLOW DIRECTION BANDS.
- WATER PIPING SHALL BE TYPE "L" COPPER FOR ALL SIZES UP TO 4". ALL UNDERGROUND WATER PIPING SHALL BE TYPE K COPPER WITHIN THE BUILDING U.O.I.H.
- INSULATE ALL COLD WATER PIPING WITH 1" PREFORMED FIBERGLASS PIPE INSULATION WITH FACTORY JACKET.
- INSULATE HOT WATER AS PER NYC ENERGY CODE.
- INSULATE HORIZONTAL STORM DRAINS IN FINISHED SPACES WITH 1" PERFORMED FIBERGLASS PIPE INSULATION WITH FACTORY JACKET, PER LATEST ASHRAE STDS.
- DI-ELECTRIC COUPLINGS ARE REQUIRED BETWEEN ALL DISSIMILAR METALS IN PIPING AND EQUIPMENT CONNECTIONS.
- ISOLATE COPPER PIPE FROM HANGER OR SUPPORTS WITH ISOLATOR PAD (HAR FELT LINING).
- UNNECESSARY NOISE SHALL BE AVOIDED AT ALL TIMES AND NECESSARY NOISE SHALL BE REDUCED TO A MINIMUM.
- CONTRACTOR SHALL CHECK AND VERIFY THE EXACT LOCATION OF ALL PIPE CORE DRILLING PENETRATIONS.
- ALL PENETRATIONS THROUGH WALLS AND FLOORS SHALL BE SLEEVED AND OPENINGS PATCHED. CORE DRILLING SHALL BE BY THIS CONTRACTOR. SEE ARCHITECTURAL DRAWINGS FOR FINAL FINISHES.
- ALL FIRE RATED FLOOR AND WALL PENETRATIONS SHALL BE PROPERLY PROTECTED FROM FIRE, SMOKE AND WATER PENETRATION BY FILLING VOIDS BETWEEN PIPE AND WALL/FLOOR SLEEVES WITH APPROVED FIRE RATED MATERIAL. TECHNOLOGY CORP.- CTC PR-855, 3M CP-25 CAULKING OR 303 PUTTY, TO ACHIEVE SAME RATINGS AS WALLS OR FLOORS.
- VERIFY EXACT SIZES, LOCATIONS, AND ELEVATIONS PRIOR TO RUNNING ANY PIPING. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS OF ALL FIXTURES AND EQUIPMENT.
- THE CONTRACTOR SHALL INSTALL PLUMBING PIPING IN LOCATIONS INDICATED ON THE CONSTRUCTION DOCUMENTS. THE ONLY DEVIATION FROM THIS WOULD BE IF ADDITIONAL OFFSETS ARE REQUIRED TO COORDINATE WITH OTHER TRADES. IF THE CONTRACTOR DESIRES TO CHANGE THE PLUMBING ROUTING FOR ANY OTHER REASON, HE SHALL SUBMIT SHOP DRAWINGS AND THE CHANGES.
- NO COMBUSTIBLE MATERIAL TO BE USED IN MECHANICAL ROOMS OR IN CEILING SPACES WHERE USED AS RETURN AIR FLEXINGS.
- ALL PLUMBING FIXTURES SHALL MEET FEDERAL STATE (WATER-SENSE LISTED) AND LOCAL CODES. FIXTURES AND TRIM SHALL BE FURNISHED AS LISTED IN FIXTURE SCHEDULE ON THIS DRAWINGS.
- CONTRACTOR SHALL COORDINATE ELECTRICAL CHARACTERISTICS AND REQUIREMENTS OF ALL PLUMBING EQUIPMENT WITH THE ELECTRICAL DRAWINGS AND SHALL FURNISH EQUIPMENT WIRED FOR THE VOLTAGES SHOWN HEREIN.
- CONTRACTOR SHALL COORDINATE EQUIPMENT CONNECTIONS WITH EQUIPMENT CONSULTANT DRAWINGS SUPPLIER. INSTALL EQUIPMENT AND MAKE FINAL CONNECTIONS FURNISHING CUTOFF VALVES, P-TRAPS, PRV'S, RP2'S AND PIPING AS REQUIRED.
- PROVIDE SHUTOFF VALVES ON ALL BRANCH PIPING AND ON ALL SUPPLIES TO INDIVIDUAL FIXTURES AND EQUIPMENT. PROVIDE BALL VALVES ON ALL WATER MAIN BRANCHES WHERE INDICATED ON DRAWINGS. ALL VALVES SHALL BE ACCESSIBLE.
- CONTRACTOR SHALL PROVIDE ROUGH-IN AND MAKE FINAL CONNECTIONS FOR EACH PIECE OF EQUIPMENT REQUIRING PLUMBING CONNECTION, INCLUDING TAILPIECES, TRAPS, LINE STRAINERS, STOP VALVES, GAUGES, VACUUM BREAKERS, REDUCING VALVES, SPECIAL FITTINGS, THERMOMETERS, GLOBE, SOLENOID VALVES, INSULATION, AND ALL NECESSARY DEVICES FOR A COMPLETE AND OPERATIVE SYSTEM. COORDINATE EXACT REQUIRED PLUMBING ROUGH-INS WITH SUPPLIER DRAWINGS.
- ALL PLUMBING FIXTURES MUST BE PROVIDED WITH READILY ACCESSIBLE STOPS AND APPROPRIATELY MARKED ACCESS PANELS. COORDINATE LOCATIONS WITH GENERAL CONTRACTOR PRIOR TO INSTALLATION.
- ALL CONTROL VALVES SHALL BE TAGGED AND MARKED. A REPRODUCEABLE DIAGRAM LOCATING ALL VALVES SHALL BE PROVIDED FOR OWNER/OPERATOR.
- PROVIDE CHROME PLATED COMBINATION COVER PLATE AND CLEANOUT PLUG OR ACCESS PANEL FOR ALL WALL CLEANOUTS AS APPROVED. ALL ARRESTORS MUST BE BELLOW TYPE ONLY AND INSTALLED WITH ACCESS DOOR.

- FURNISH AND INSTALL WATER HAMMER ARRESTORS AND P.D.I. SHOCK ARRESTORS ON MAIN PIPES ON RISERS AND ON ANY HW AND CW PIPING WITH QUICK CLOSING VALVES FOR ENGINEERS APPROVAL.
  - AS SOON AS THE WATER PIPING HAS BEEN THOROUGHLY FLUSHED OUT, STERILIZE THE NEW WATER PIPING LINES BY INTRODUCING IN THEM A SOLUTION OF CALCIUM HYPOCHLORITE OR CHLORIDE OF LIME. OPEN AND CLOSE ALL NEW VALVES WHILE SYSTEM IS BEING CHLORINATED. AFTER THE STERILIZING AGENT HAS BEEN APPLIED FOR 24 HOURS, TEST FOR RESIDUAL CHLORINE AT THE ENDS OF LINES. IF MORE THAN 10 PARTS PER MILLION IS INDICATED, REPEAT THE PROCESS. WHEN TESTS SHOW LESS THAN 10 PARTS PER MILLION OF RESIDUAL CHLORINE, FLUSH OUT THE SYSTEM UNTIL ALL TRACES OF THE CHEMICAL USED ARE REMOVED. MAKE NECESSARY CONNECTIONS TO STERILIZE PIPING.
  - AFTER STERILIZATION HAS BEEN ACCOMPLISHED INITIATE A BACTERIOLOGICAL TEST PERFORMED BY AN APPROVED TESTING LABORATORY. WATER SHALL BE DRAWN FROM THE SYSTEM AT A POINT FURTHEST FROM THE WATER ENTRANCE TO THE BUILDING. A CERTIFIED TEST REPORT OF THESE TESTS INDICATING SATISFACTORY COLIFORM COUNT, COLOR AND CHLORINE RESIDUAL SHALL BE PRESENTED TO THE ARCHITECT AND OWNER WHEN THE WATER SUPPLY PIPING SYSTEM IS SUBSTANTIALLY COMPLETED DURING CONSTRUCTION. ANOTHER SIMILAR TEST SHALL BE PERFORMED AT THE TIME OF ISSUANCE OF THE CERTIFICATE OF OCCUPANCY WITH ANOTHER CERTIFIED TEST REPORT PRESENTED TO THE ARCHITECT AND OWNER AT THAT TIME.
  - APPLY A WATER PRESSURE TEST TO ALL PARTS OF THE WATER PIPING SYSTEM NOT LESS THAN 150 PSIG OR 1.25 TIMES THE SYSTEM WORKING PRESSURE (WHICHEVER IS GREATER), FOR A PERIOD OF 4 HOURS. REPAIR ANY LEAKS.
  - APPLY A WATER TEST TO ALL PARTS OF THE SANITARY AND STORM DRAINAGE SYSTEMS, BEFORE THE PIPES ARE CONCEALED OR FIXTURES SET IN PLACE. THESE TESTS MAY BE APPLIED IN SECTIONS. CLOSE ALL OPENINGS TO EACH SYSTEM TO BE TESTED EXCEPT THE HIGHEST OPENING ABOVE THE ROOF AND FILL THE SYSTEM WITH WATER UP TO THE OVERFLOW POINTS OF THIS HIGHEST OPENING. SUBJECT ALL PARTS OF THE SYSTEM TO NOT LESS THAN 10' OF THE PIPING DIRECTLY BELOW THE OPENING. LEAVE THE WATER IN THE SYSTEM FOR NOT LESS THAN 30 MINUTES, AFTER WHICH TIME NO LEAKS AT ANY POINT OR LOWERING OF THE WATER LEVEL AT THE OVERFLOW SHALL BE VISIBLE.
  - 
  - PROVIDE MINIMUM 12"x12" ACCESS DOORS FOR ALL CLEANOUTS, VALVES AND ANY OTHER EQUIPMENT AND ACCESSORIES THAT MAY REQUIRE ACCESS FOR MAINTENANCE OR OPERATION WHICH ARE LOCATED BEHIND WALLS AND PARTITIONS OR CONCEALED ABOVE SHEETROCK-TYPE HUNG CEILINGS. COORDINATE FINAL LOCATIONS WITH ARCHITECT.
  - INTERIOR FLOOR CLEANOUTS SHALL BE ZURN, WADE, SMITH OR JOSAM.
  - REFER TO DRAIN SCHEDULE (ON THIS DRAWING) FOR ALL DRAIN APPLICATIONS.
  - FURNISH AND INSTALL ALL INCIDENTAL-TYPE FLOOR DRAINS WITH TRAP PRIMER SYSTEM.
  - CONTRACTOR SHALL PROVIDE TRAP PRIMERS ON ALL FLOOR DRAINS NOT RECEIVING CONSTANT DISCHARGE FROM FIXTURES AND/OR EQUIPMENT, OR AS REQUIRED BY CODE.
  - ALL HOSE BIBBS SHALL BE CHROME PLATED 3/4" SOLID FLANGE THREADED HOSE AND LOOSE KEY W/VACUUM BREAKER - WATTS BA, MOUNTED 26" ABOVE GRADE. WALL HYDRANTS TO BE ZURN, WADE, SMITH & JOSAM, UNLESS OTHERWISE NOTED.
  - PROVIDE CLAMPS, OFFSETS, EXPANSION JOINTS, ANCHORS AND GUIDES AS NECESSARY TO PREVENT PIPING STRESS.
  - ALL METALLIC PIPING, FITTINGS AND HANGERS EXPOSED TO CORROSIVE CONDITIONS SHALL HAVE A PROTECTIVE COATING THAT RESIST CORROSION.
  - MANUFACTURER'S MODEL NUMBERS ARE SPECIFIED SOLELY TO ESTABLISH STANDARDS OF QUALITY FOR PERFORMANCE AND MATERIALS.
  - PRODUCTION INSTALLATION SHALL ADHERE TO MANUFACTURERS' RECOMMENDATIONS.
  - THE SANITARY DRAINAGE SYSTEM IS NOT INTENDED FOR CORROSIVE OR HAZARDOUS WASTES.
  - UNDER NO CIRCUMSTANCES WILL THIS CONTRACTOR OR HIS WORKMEN BE PERMITTED TO USE ANY PART OF THE BUILDING AS A SHOP, EXCEPT AS DESIGNATED BY THE OWNER FOR SUCH PURPOSES.
  - CONTRACTOR SHALL KEEP A SET OF AS-BUILT DRAWINGS ON THE JOB SITE AT ALL TIMES AND DELIVER A SET OF UP TO DATE AS-BUILTS TO THE ENGINEER AND OWNER AT THE COMPLETION OF THE PROJECT.
  - CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL, WITHIN 30 DAYS OF SIGNING CONTRACT, A MINIMUM OF 5 COPIES OF FULLY DESCRIPTIVE LITERATURE INCLUDING, BUT NOT LIMITED TO, WATER HEATERS, PUMPS, AIR COMPRESSORS, DI SYSTEM, AND PLUMBING FIXTURES AND ETC. NO WORK SHALL PROCEED WITHOUT THE APPROVAL OF THESE SUBMITTALS.
  - ALL VENT STACKS (VTR) SHALL BE A MINIMUM OF 10'-0" AWAY FROM A/C FRESH AIR INTAKES, DOORS OR WINDOWS OPENINGS.
  - ALL PLUMBING PIPING TO BE FIRE STOP FOR PIPING CROSSING FIRE RATED ELEMENTS
  - ALL INSULATION DAMAGE/MISS SHALL BE REINSTALL PER 2016 NYCECC.
- FOR NYCECC PROGRESS INSPECTION REFER TO EN DRAWING.

NOTE: SUB-WATER METERS:  
ALL TENANT HOT & COLD SUB-WATER METERS FOR C-2 LEVEL AND 4TH TO 12TH FLOORS WHERE INDICATED IN PLANS SHALL BE NEPTUNE 1-10 E-CODER (WITH REMOTE READERS). PROVIDE TRI CON-E-TRANSMITTER FOR EACH SUB-WATER METER TO BE TIED TO THE BASE BUILDING BMS SYSTEM. GENERAL CONTRACTOR AND PLUMBING CONTRACTOR TO COORDINATE ALL METER LOCATIONS AND INSTALLATIONS WITH BASE BUILDING ENGINEERS.

NOTE: ACCESS / ACCESS DOORS  
ACCESS / ACCESS DOORS TO BE PROVIDED FOR ACCESS TO ALL DOMESTIC SHUT OFF VALVES, TENANT SUB-WATERS AND TRAP PRIMERS IN CEILINGS. COORDINATE ALL LOCATIONS WITH ARCHITECTURAL DRAWINGS, GENERAL CONTRACTOR AND PLUMBING DRAWINGS HEREIN.

ACOUSTIC NOTE:  
ANY SANITARY WASTE WATER PIPING LOCATED IN THE CEILING(S) ABOVE CONFERENCE ROOMS SHALL BE WRAPPED IN MASS LOADED VINYL ACOUSTICAL BARRIER WITH DECOUPLING INSULATION LAYER. REFER TO PLUMBING DRAWINGS FOR ANY / ALL SANITARY PIPING IN LOCATIONS ABOVE CONFERENCE ROOM CEILINGS.  
RECOMMENDED PRODUCTS :  
1. SOUND SEAL LAG PIPE B20 WITH 1" QUILTED DECOUPLING INSULATION.  
2. KINETICS PIPE AND DUCT WRAP MODEL KNM-200AL WITH 1" THICK DECOUPLING INSULATION.  
IN EITHER CASE, WHERE PIPE IS SUPPORTED, SPECIFY CLEVIS HANGERS WITH LOAD SPREADING SLEEVES SO INSULATION IS NOT CRUSHED.



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JFK&M ENGINEERS, LLP 134 West 37th Street New York, NY 10018 212.792.8700

REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:

DRAWING TITLE:  
**PLUMBING SYMBOLS LIST ABBREVIATIONS, AND GENERAL NOTES**

SCALE: NTS DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**P-001**  
DRAWING ORDER: 146 of 205



REVISION	DESCRIPTION	DATE

PROJECT: **NYC BBJ**  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:

PROJECT NORTH 

DRAWING TITLE:  
**PLUMBING SCHEDULES**

SCALE: NTS DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:

**P-002**

DRAWING ORDER: 147 of 205

**SLOPE OF HORIZ. DRAINAGE PIPE**

SIZE (inches)	MINIMUM SLOPE (inch per foot)
2-1/2 or less	1/4
3 to 6	1/8
8 or larger	1/16

AS PER NYC BUILDING CODE TABLE 704.1

**WATER HAMMER ARRESTOR SCHEDULE**

P.D.I. DESIGNATION	MANUF. & MODEL	FIXTURE UNITS	CONNECTION
A	J.R. SMITH FIG. 5005	1-11	1/2"
B	J.R. SMITH FIG. 5010	12-32	3/4"

**BUILDING DEPARTMENT PLUMBING NOTES**

ALL PLUMBING WORK SHALL MEET THE REQUIREMENTS OF PLUMBING CODE 2008 IN ACCORDANCE WITH THE REQUIREMENTS OF THE CITY OF NEW YORK BUILDING CODE 2008, AND ALL AMENDMENTS.

- PROTECTION OF PIPING AS OUTLINED IN CHAPTER 3, SECTION PC 305 SHALL BE PROVIDED AS REQUIRED.
- ALL PIPING AND MATERIALS SHALL BE AS DIRECTED IN CHAPTER 3, SECTION 303.
- PIPING JOINTS AND CONNECTIONS SHALL BE AS APPROVED IN PLUMBING CODE 2008 FOR EACH SPECIFIC TYPE OF SYSTEM.
- CONSTRUCTION, QUANTITIES, DEVICES, FIXTURES, FAUCETS, VALVES AND FACILITIES FOR DISABLED SHALL BE AS OUTLINED IN CHAPTER 4, SECTION PC 404.
- CLEANOUTS SHALL BE AS PER CHAPTER 7, SECTION PC 708.
- TRAPS SHALL BE AS PER CHAPTER 10, SECTION PC 1103.
- CONSTRUCTION AND SPACING OF HANGERS AND SUPPORTS SHALL BE AS DIRECTED IN CHAPTER 3, SECTION PC 308.
- WATER SUPPLY SYSTEM, VALVES AND TESTS SHALL BE AS DIRECTED IN CHAPTER 6.
- SANITARY DRAINAGE PIPING, SIZING, GRADING AND OFFSETS SHALL BE AS OUTLINED IN CHAPTER 7.
- CLEANOUTS SHALL BE AS PER CHAPTER 7, SECTION PC 708.
- TRAPS SHALL BE AS PER CHAPTER 10, SECTION PC 1103.
- CONSTRUCTION AND SPACING OF HANGERS AND SUPPORTS SHALL BE AS DIRECTED IN CHAPTER 3, SECTION PC 308.
- WATER SUPPLY SYSTEM, VALVES AND TESTS SHALL BE AS DIRECTED IN CHAPTER 6.
- SANITARY DRAINAGE PIPING, SIZING, GRADING AND OFFSETS SHALL BE AS OUTLINED IN CHAPTER 7.
- VENT SIZING, GRADING, CONNECTIONS, LOCATIONS AND OFFSETS SHALL BE AS DIRECTED IN CHAPTER 9.
- SPECIAL AND MISCELLANEOUS PIPING SHALL BE AS DIRECTED IN CHAPTER 12.
- INDIRECT WASTE PIPING SHALL BE AS DIRECTED IN CHAPTER 8.
- ALL PLUMBING FIXTURES SHALL COMPLY WITH CHAPTER 4.

**PUMP SCHEDULE**

EQUIPMENT	LOCATION	QUANTITY		MOTOR				RATED CAP. GPM	HEAD FT	SIMILAR TO (MANUFACT. & MODEL)
		TOTAL	EMERG.	HP EA.	RPM	VOLTS	PH			
DUPLEX DOMESTIC WATER BOOSTER PUMPS SYSTEM	CELLAR	2	X	3	-	208	3	75	-	PEERLESS MODEL: ( )
DUPLEX SEWAGE EJECTOR PUMPS	CELLAR	2	X	2	-	208	3	75	-	FLYGT MODEL: ( )
SIMPLEX ELEVATOR SUMP PUMPS	ELEVATOR PITS	2	X	1/2	-	115	1	100	-	STANCOR MODEL: SE-100
DUPLEX STORM WATER DETENTION PUMPS	DETENTION TANK PIT	2	X	-	-	208	3	112	-	PEERLESS MODEL: ( )
DUPLEX SUMP PUMPS	CELLAR	2	X	2	-	208	3	60	-	FLYGT MODEL: ( )
DUPLEX GREY WATER BOOSTER PUMPS	CELLAR	2	X	3	-	208	3	60	-	FLYGT MODEL: ( )

**MATERIAL SCHEDULE**

SYSTEMS	PIPE										FITTINGS										JOINTS																	
	REQUIRED	C.I.	STL. SCHED. 40	DURON A.R.C.I.	BLACK	GALVANIZED SCH. 80	C.T. "L"	C.T. "X"	D.U.M.P.	GLASS	POLYPROPYLENE P.P.	C.P.V.C. SCHEDULE 80	C.I. NO-HUB	C.I. SOIL	C.I. DRAINAGE	STD. C.I. 175# W.W.P.	EX. H. C.I. 400# W.W.P.	STD. C.I. 175# W.W.P.	STD. WALL-300# W.W.P.	DURON A.R.C.I.	CAST BRONZE-175# W.W.P.	CAST BRONZE-400# W.W.P.	POLYPROPYLENE P.P.	SOLDER FITTINGS	C.P.V.C. SCHEDULE 80	GLASS	GALVANIZED	CAULKED	THREADED	SOLDERED 99-5	S.S. COUPLING	BRAZEN	NO-HUB S.S. COUPLING	GASKET	WELDED			
SANITARY BRANCHES																																						
VENTS																																						
C.W.																																						
H.W.																																						
H.W.R.																																						
EJECTOR DISCHARGE																																						
INDIRECT WASTE																																						

NOTES:

- REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

**DRAIN ACCESSORIES & SCHEDULE**

DESIGNATION	REQUIRED	SERIES NO. ZURN WADE SMITH JOSAM	BODY													STRAINER													REMARKS							
			CAST IRON	GALVANIZED	ALL BRONZE	SECONDARY CLAMP	CLAMPING DEVICE	DECK CLAMP	BACK WATER VALVE	SUMP RECEIVER	FLASHING COLLAR	CAST IRON	GALVANIZED	ALL BRONZE	NICKEL BRONZE (ADJUSTABLE)	CHROME PLATED	SEDIMENT BUCKET	SECONDARY STRAINER	POLISHED FINISH	SATIN FINISH	TRACTOR GRATE	ST. STEEL	FUNNEL TOP	FLAT TOP	DOME	RAISED LIP	EXTENSION (WHERE REQUIRED)	LESS GRATE		BRONZE TOP	IRON GRATE	POLYETHYLENE	SOLID HINGED COVER			
FD/AD		Z504-C-Y-DG 12"																																		MECH. ROOMS/ TOILET ROOMS
RD/OD		RD: ZC-125-C-E-SC-SS OD: ZC-125-C-E-SC-89																																		COMBINATION MAIN ROOF AND OVERFLOW DRAIN, WHERE INSTALLED BELOW PAVERS/SOIL USE (-SS) ST.STL. MESH SCREEN OVER DOME.
GD		Z- ( )																																	GARAGE	
HD		Z566-GT																																	SET HUB DRAIN FOR SPRINKLER ABOVE FLOOR	
N.F.W.H		NON FREEZE WALL HYDRANT MODEL ZN-1300																																	EXTERIOR WALLS	
H.B.		HOSE BIB-ZURN MODEL 195																																	MECHANICAL ROOMS/GARAGE	

NOTES:

- ALL FLOOR DRAINS IN FINISHED AREAS AND ALL ROOF DRAINS SHALL BE LOCATED AS PER THE ARCHITECTURAL DRAWINGS.
- ALL FLOOR DRAINS IN MECHANICAL EQUIPMENT ROOMS, SHALL BE COORDINATED WITH MECHANICAL CONTRACTOR, AND GENERAL CONTRACTOR.
- THE CONTRACTOR SHALL VERIFY THE COMPATIBILITY OF THE DRAINS WITH THE APPROVED ROOFING AND/OR WATER PROOFING SYSTEMS PRIOR TO SUBMITTING SHOP DRAWINGS.
- THE TOP OF ALL FLOOR DRAINS SHALL BE FLUSH WITH FINISHED FLOOR.
- TRAP PRIMERS TO ALL FLOOR DRAINS SHALL BE AS SPECIFIED ON FLOOR PLANS.

ELECTRONIC TRAP PRIMER VALVE BOXES FOR 1/2" COLD WATER DISTRIBUTION CONNECTIONS TO INDIVIDUAL DRAIN TRAPS SHALL BE: PRECISION PRODUCTS-FOR CORE TOILET ROOM AND REMOTE PANTIES FLOOR DRAINS. (PPP-MP-500) (115V) (1 PHASE) CONTROL BOX (WALL MOUNTED).

**PLUMBING EQUIPMENT/SERVICES LOAD CALCULATIONS:**

DUPLEX DOMESTIC BOOSTER PUMPS: CELLAR  
(5)Lavatories (1) Shower (2) Drinking fountains (2) Service sinks (10 Hose bibs  
Total (20.5 FU) = (20gpm) Estimated Available Street Pressure = (38 PSI)  
Elev. 133' Less Elev. 40' = 93' Static, Highest Hose Bib = 16', Friction = 5'  
114' - 53' Available Suction = 61'  
(50GPM X 61' / 2574 = (0.47 + 0.18) = 0.65 HP  
\*Provide Duplex' 3HP/208V/3PH alternating pump set.

DUPLEX GREY WATER BOOSTER PUMPS: (Toilet flushing only) CELLAR  
(5)Flush Valve Water closets x (10 FU) EA = 50 cwfu = 50 GPM  
Estimated Available Street pressure = (38 PSI)  
Adjusted available Street Pressure after service losses = (23 PSI)  
23psi = 53', Highest fixture = 35 psi = 80', Friction = 5', Static = 26'  
(50 GPM) X 111' / 2574 = 2.15 HP + 0.64HP = 2.79HP  
\*Provide Duplex' 3HP/208V/3PH alternating Grey Water System booster pump set.

DUPLEX SUMP PUMPS: (Garage Drains) CELLAR  
(50GPM) X 19' / 2574 = (0.36HP + 0.11HP) = 0.47HP  
\*Provide Duplex' 2HP/208V/3PH alternating Sump pump set.

DUPLEX SEWAGE EJECTOR PUMPS: (Cellar Drainage) CELLAR  
(50GPM) X 19' / 2574 = (0.36HP + 0.11HP) = 0.47HP  
\*Provide Duplex' 2HP/208V/3PH alternating Ejector pump set.

ELECTRIC POINT OF USE and STORAGE TYPE WATER HEATERS: Toilet rooms  
Provide 3KW Instantaneous water heaters in ground and second floor toilet rooms.  
Provide 6KW (20 GALLON) Storage type Electric Water heater, ceiling mounted in Garage toilet room.  
Provide 6" Combined Gravity Sanitary/Storm House Drain to 131<sup>st</sup> Street. 2" Storm detention tank Pump(s) discharge to be coordinated with Civil Engineer.  
Provide 3" Incoming Domestic Water Service from 131<sup>st</sup> Street.  
(70 CWFU) = 58 GPM = 2" Supply Demand. Provide 3" incoming Domestic Water Service for Future' expansion /fixture allowances.

NOTE: CALCULATIONS PROVIDED HEREIN BASED UPON "ESTIMATED AVAILABLE" CITY WATER MAIN STREET PRESSURE.

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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:

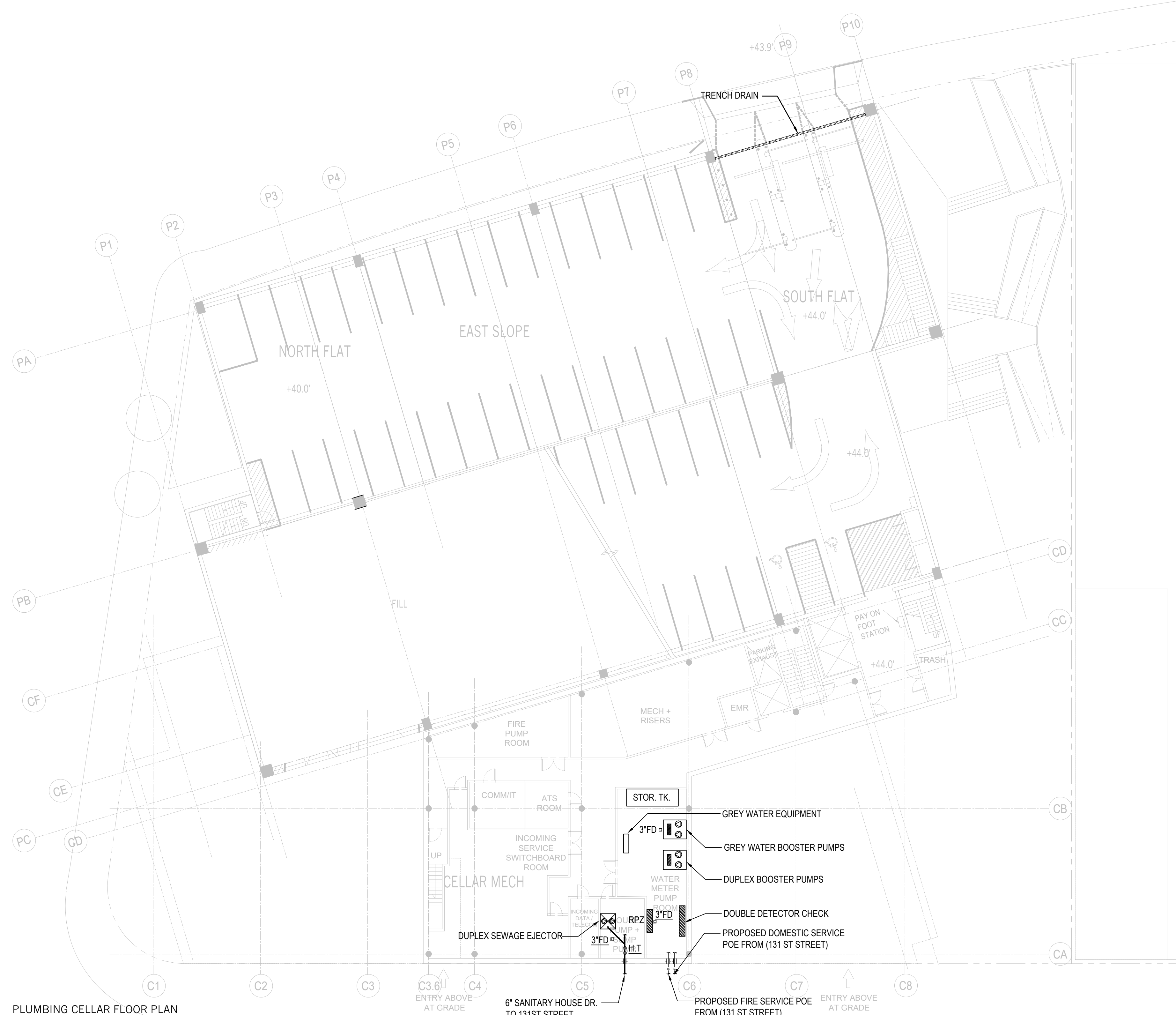
PROJECT NORTH 

DRAWING TITLE:  
**PLUMBING CELLAR PLAN**

SCALE: 1/16"=1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**P-100**  
DRAWING ORDER: 148 of 205



**01** PLUMBING CELLAR FLOOR PLAN  
1/16" = 1'-0"

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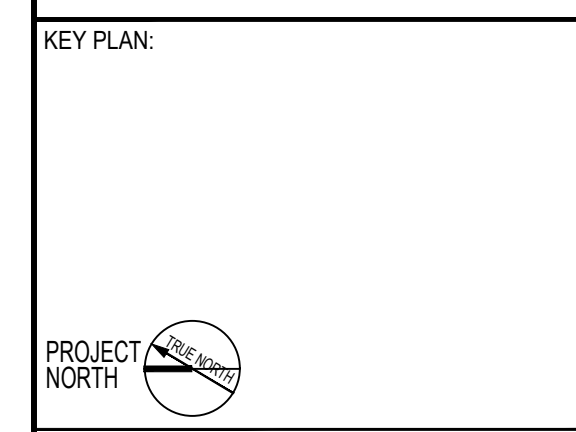
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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:



PROJECT NORTH 

DRAWING TITLE:  
**PLUMBING FIRST FLOOR PLAN**

SCALE: 1/16"=1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**P-101**  
DRAWING ORDER: 149 of 205



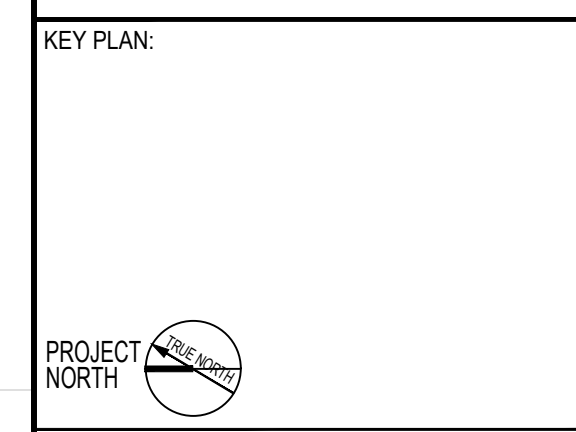
**01** PLUMBING FIRST FLOOR PLAN  
1/16" = 1'-0"

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REVISION	DESCRIPTION	DATE

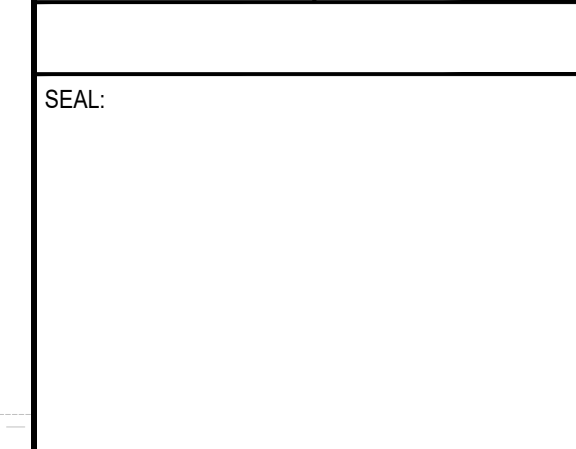
PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
 80-25 126th St,  
 Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:  


PROJECT NORTH   
 DRAWING TITLE:  
**PLUMBING SECOND FLOOR PLAN**


SCALE: 1/16"=1'-0" DATE: SEPTEMBER 18, 2020

SEAL:  


DRAWING NUMBER:  
**P-102**  
 DRAWING ORDER: 150 of 205



**01** PLUMBING SECOND FLOOR PLAN  
 1/16" = 1'-0"

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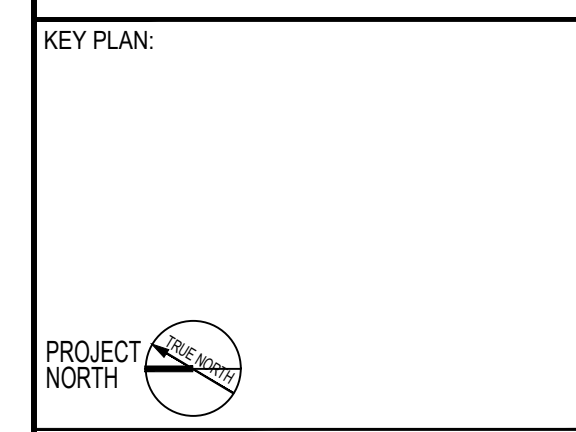
JAROS, BAUM & BOLLES / LIGHTBOX STUDIOS  
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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:  


PROJECT NORTH 

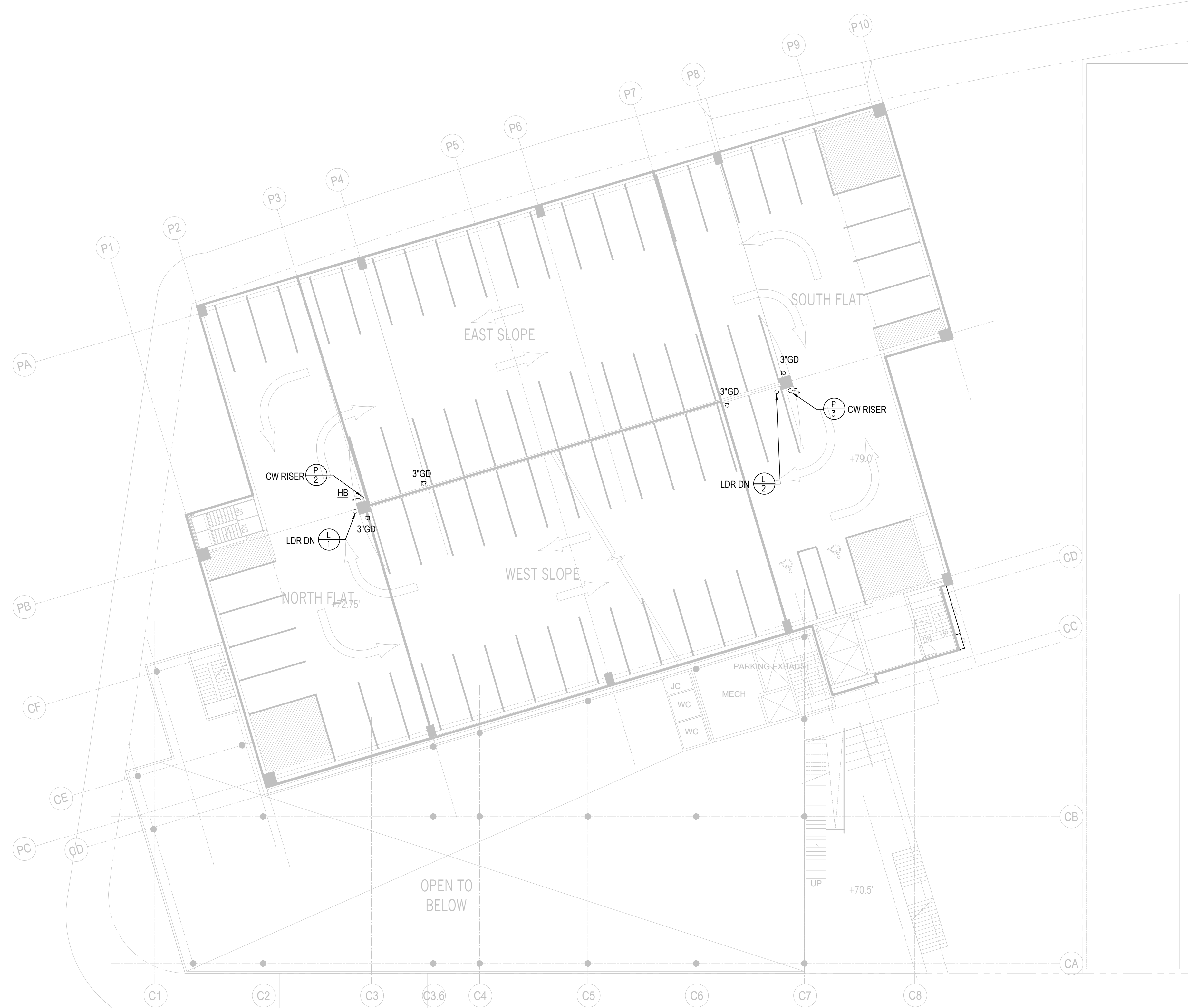
DRAWING TITLE:  
**PLUMBING  
THIRD FLOOR  
PLAN**

SCALE: 1/16"=1'-0"	DATE: SEPTEMBER 18, 2020
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SEAL:

DRAWING NUMBER:  
**P-103**

DRAWING ORDER: 151 of 205



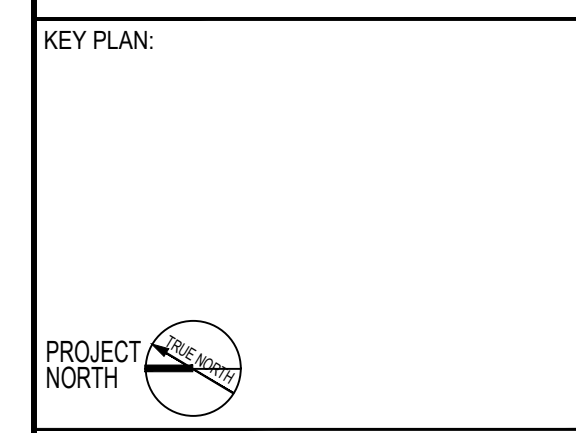
**01** PLUMBING THIRD FLOOR PLAN  
1/16" = 1'-0"

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134 West 37th Street, New York, NY 10018  
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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

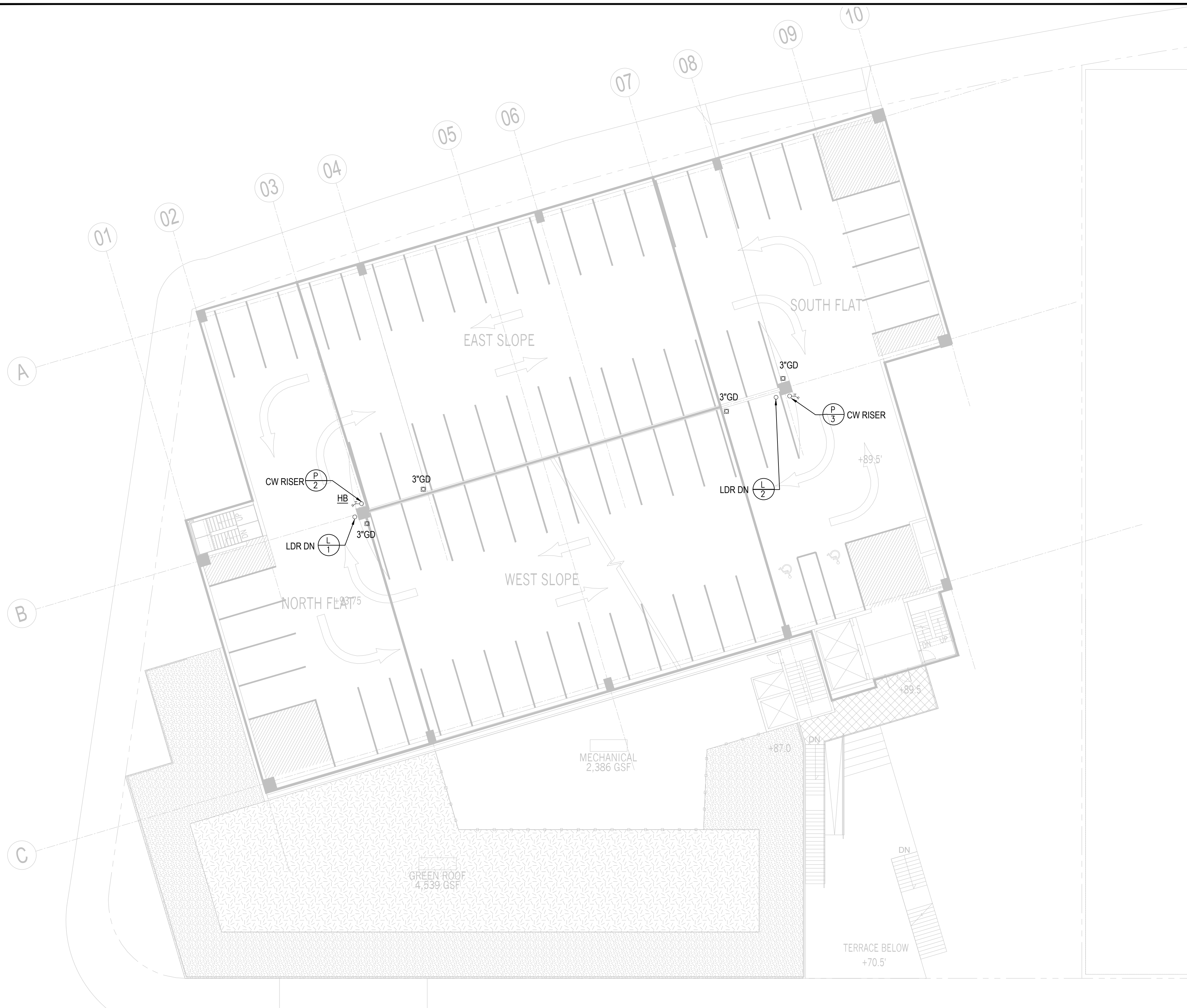
KEY PLAN:  


PROJECT NORTH   
DRAWING TITLE:  
**PLUMBING  
FOURTH FLOOR  
PLAN**

SCALE: 1/16"=1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**P-104**  
DRAWING ORDER: 152 of 205



**01** PLUMBING FOURTH FLOOR PLAN  
1/16" = 1'-0"

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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
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**TECHNICAL DRAWINGS**

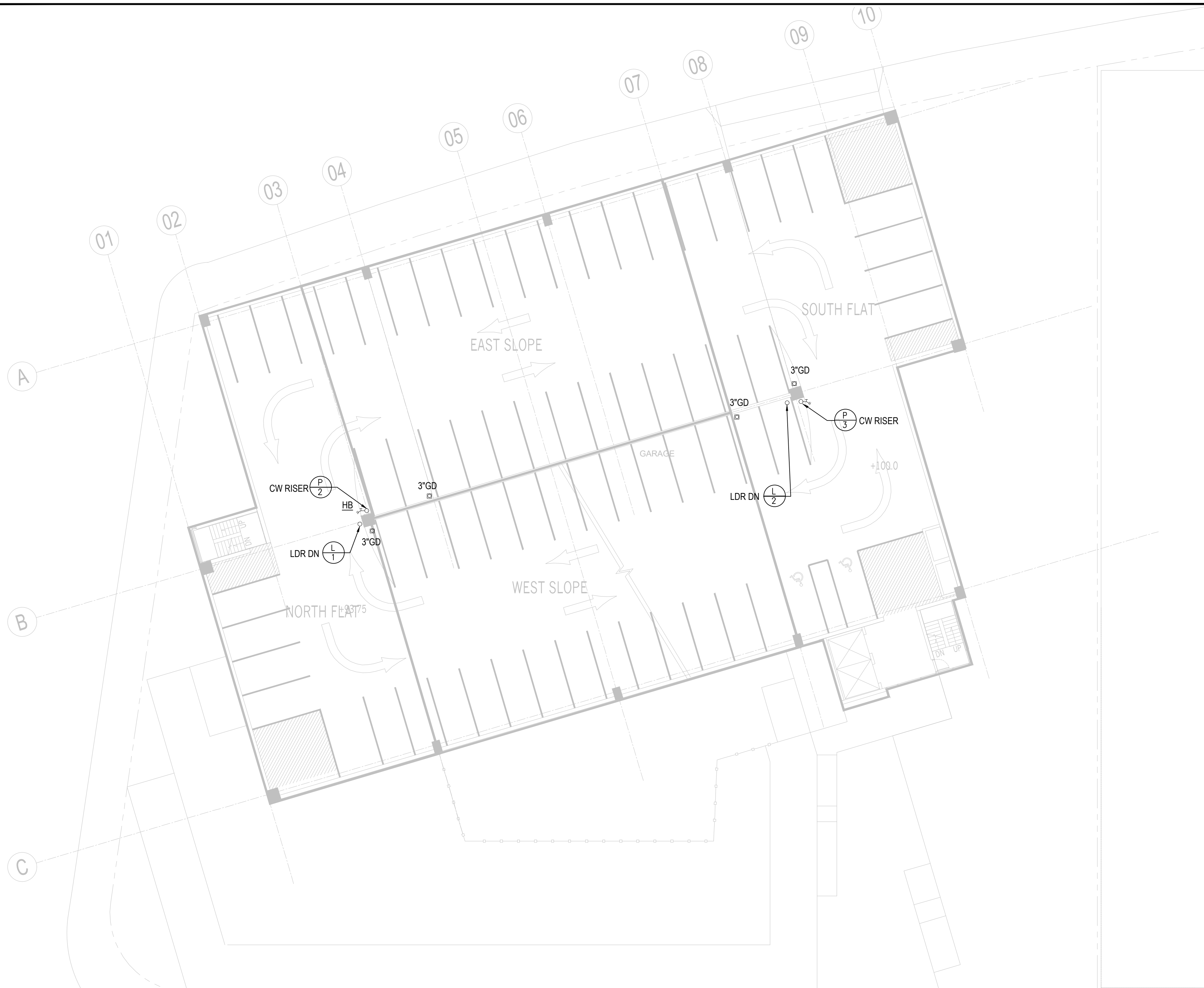
KEY PLAN:  
  
PROJECT NORTH 

DRAWING TITLE:  
**PLUMBING FIFTH FLOOR PLAN**

SCALE: 1/16"=1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**P-105**  
DRAWING ORDER: 153 of 205



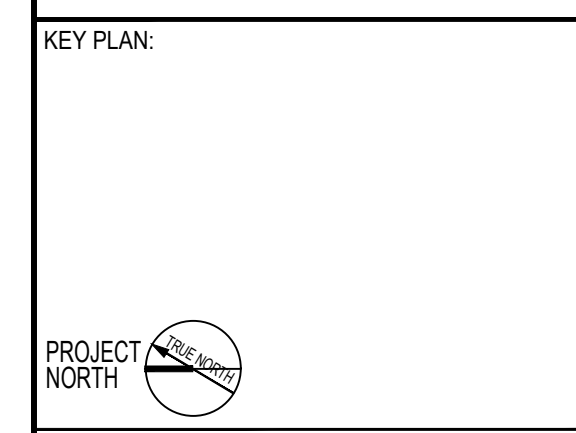
**01** PLUMBING FIFTH FLOOR PLAN  
1/16" = 1'-0"

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REVISION	DESCRIPTION	DATE

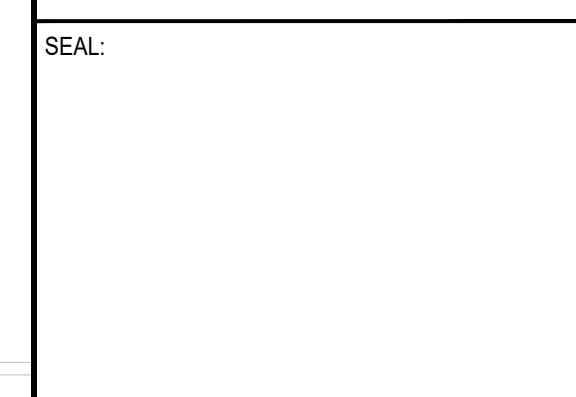
PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
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**TECHNICAL DRAWINGS**

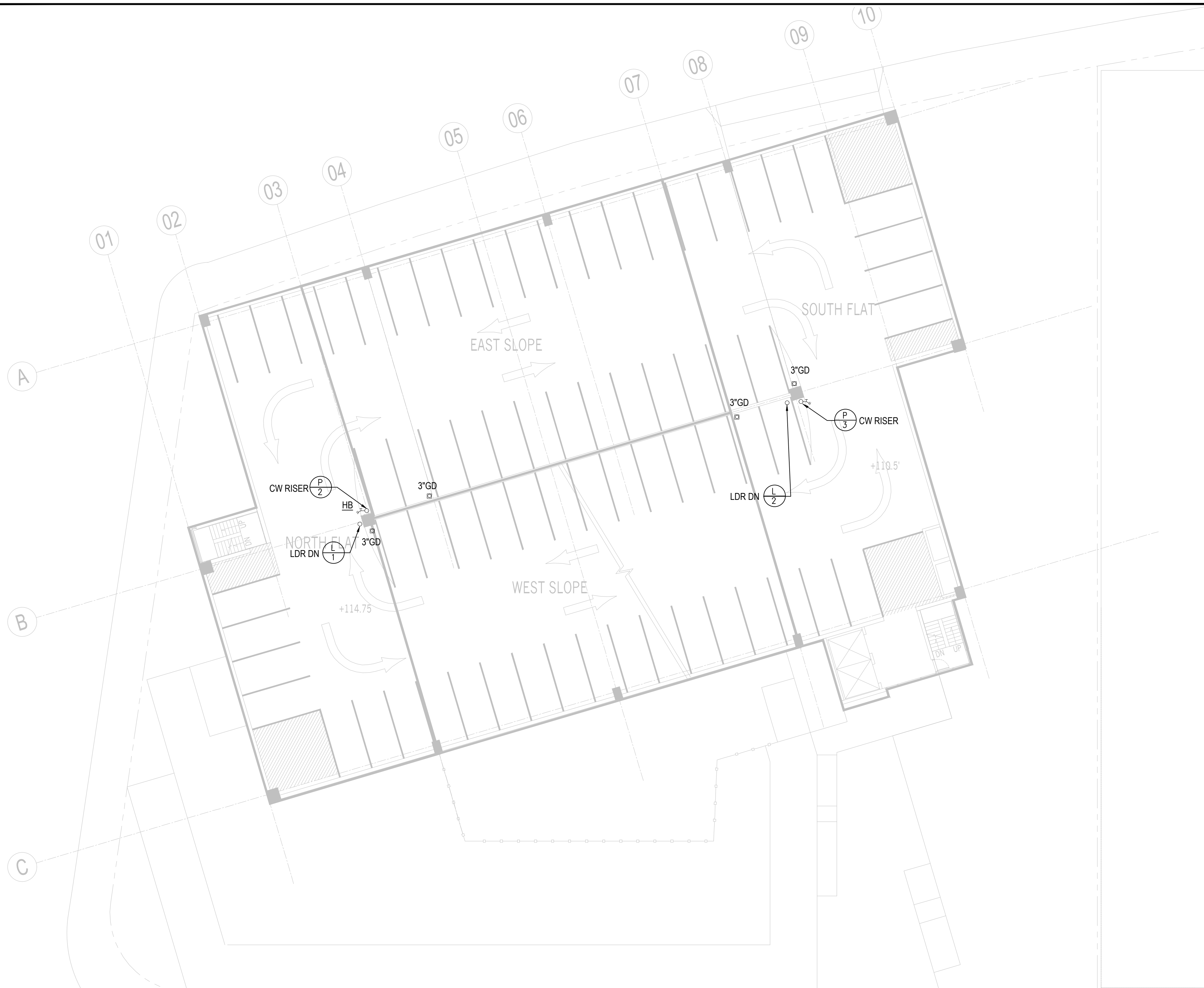
KEY PLAN:  


PROJECT NORTH   
 DRAWING TITLE:  
**PLUMBING SIXTH FLOOR PLAN**

SCALE: 1/16"=1'-0" DATE: SEPTEMBER 18, 2020

SEAL:  


DRAWING NUMBER:  
**P-106**  
 DRAWING ORDER: 154 of 205



**01** PLUMBING SIXTH FLOOR PLAN  
 1/16" = 1'-0"



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MARVEL ARCHITECTS  
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THORNTON TOMASETTI  
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917.661.7800

MATRIX NEW WORLD ENGINEERING  
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212.699.4749

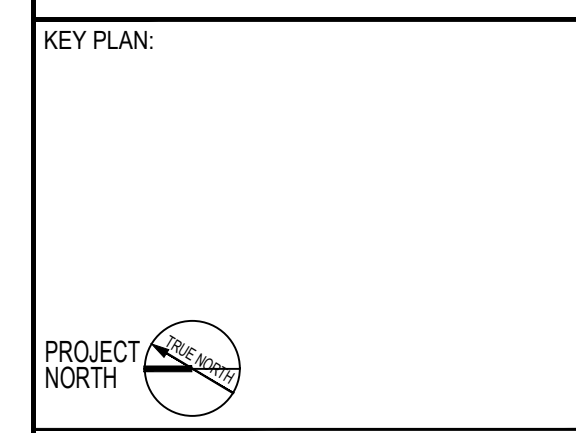
JAROS, BAUM & BOLLES / LIGHTBOX STUDIOS  
80 Pine Street New York, NY 10015  
212.530.9300

JFK&M ENGINEERS, LLP  
134 West 37th Street New York, NY 10018  
212.792.8700

REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

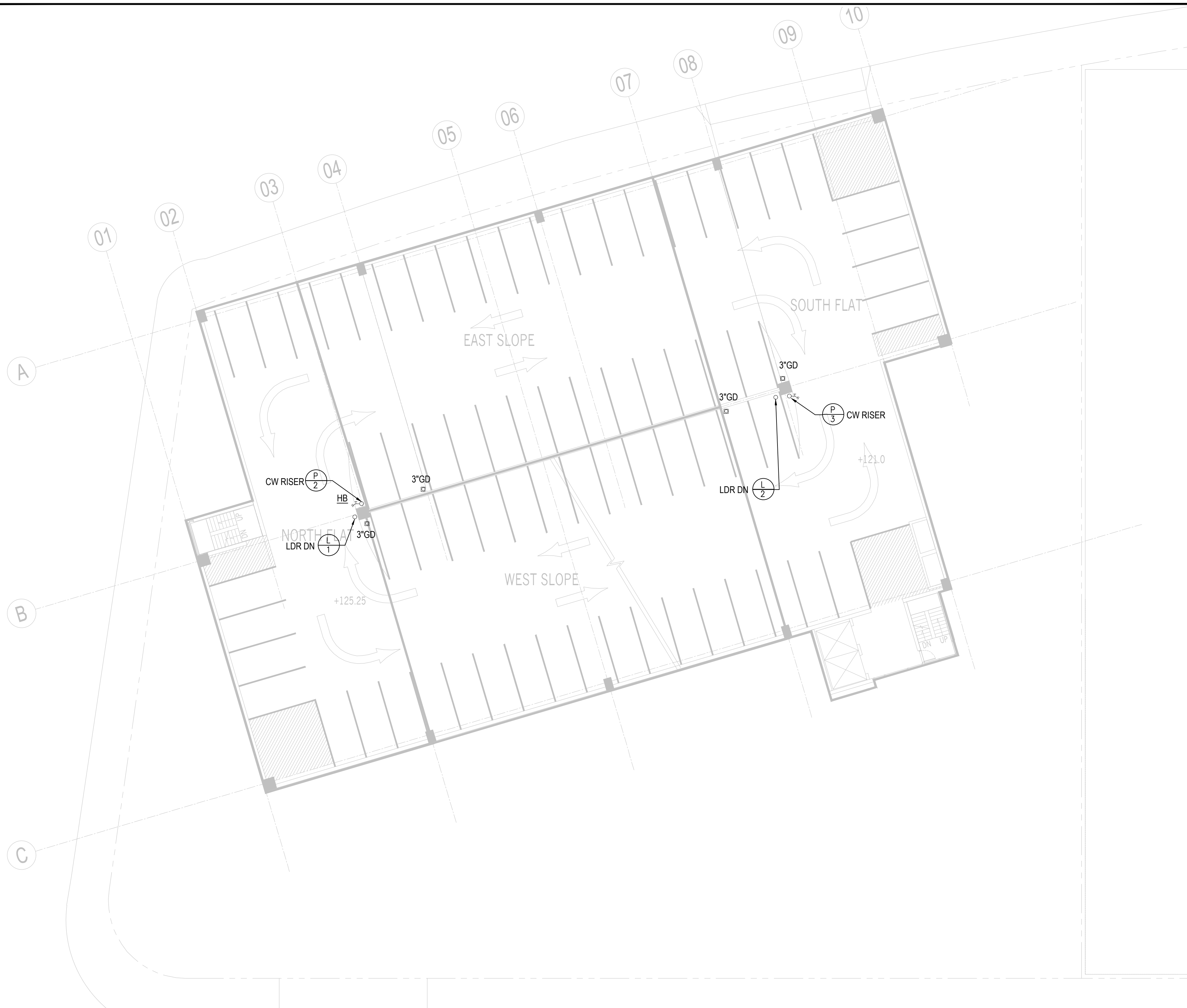
KEY PLAN:  


PROJECT NORTH   
DRAWING TITLE:  
**PLUMBING SEVENTH FLOOR PLAN**

SCALE: 1/16"=1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**P-107**  
DRAWING ORDER: 155 of 205



**01** PLUMBING SEVENTH FLOOR PLAN  
1/16" = 1'-0"

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REVISION	DESCRIPTION	DATE

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**TECHNICAL DRAWINGS**

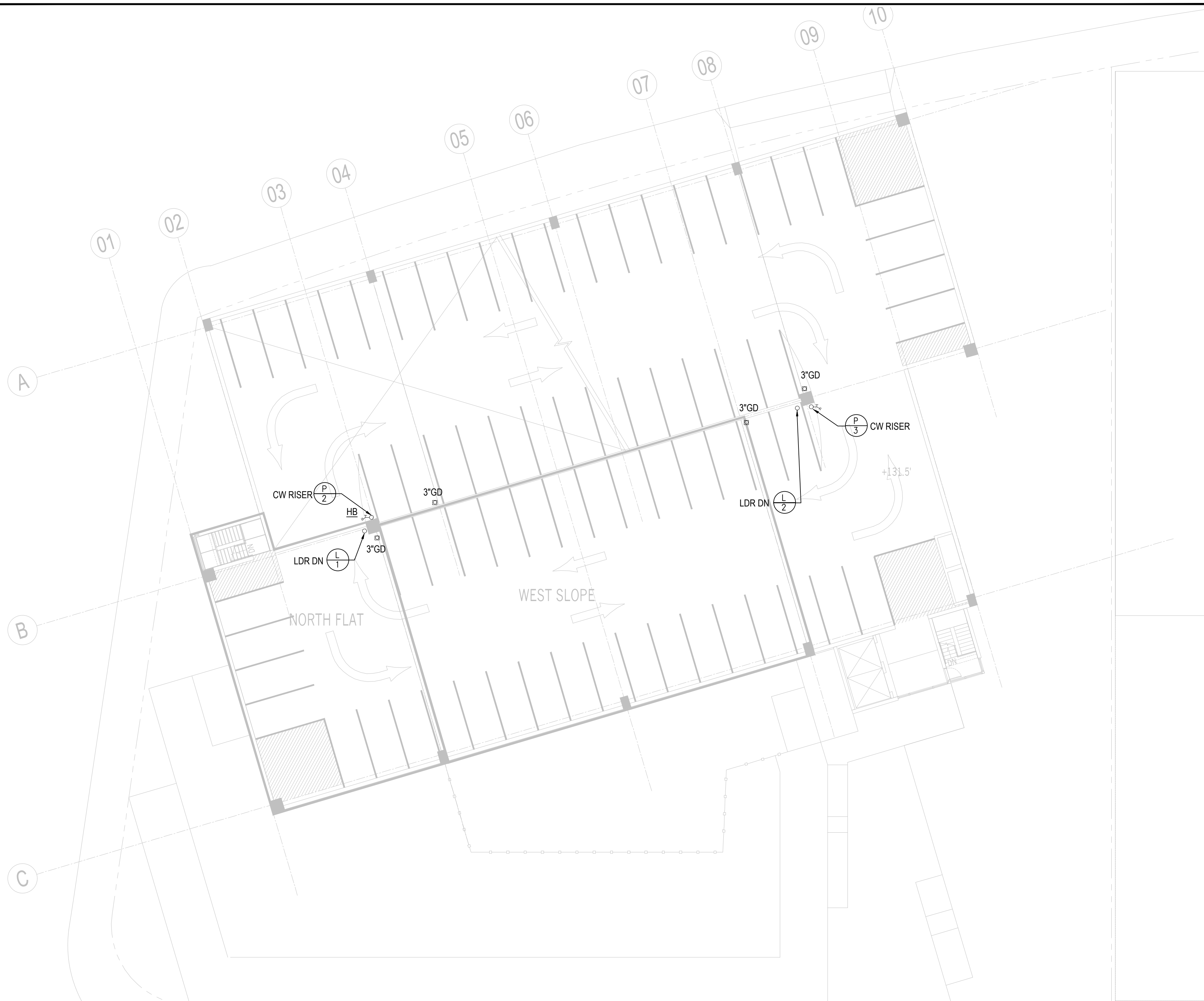
KEY PLAN:  
  
PROJECT NORTH 

DRAWING TITLE:  
**PLUMBING EIGHTH FLOOR PLAN**

SCALE: 1/16"=1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**P-108**  
DRAWING ORDER: 156 of 205



**01** PLUMBING EIGHTH FLOOR PLAN  
1/16" = 1'-0"

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**TECHNICAL DRAWINGS**

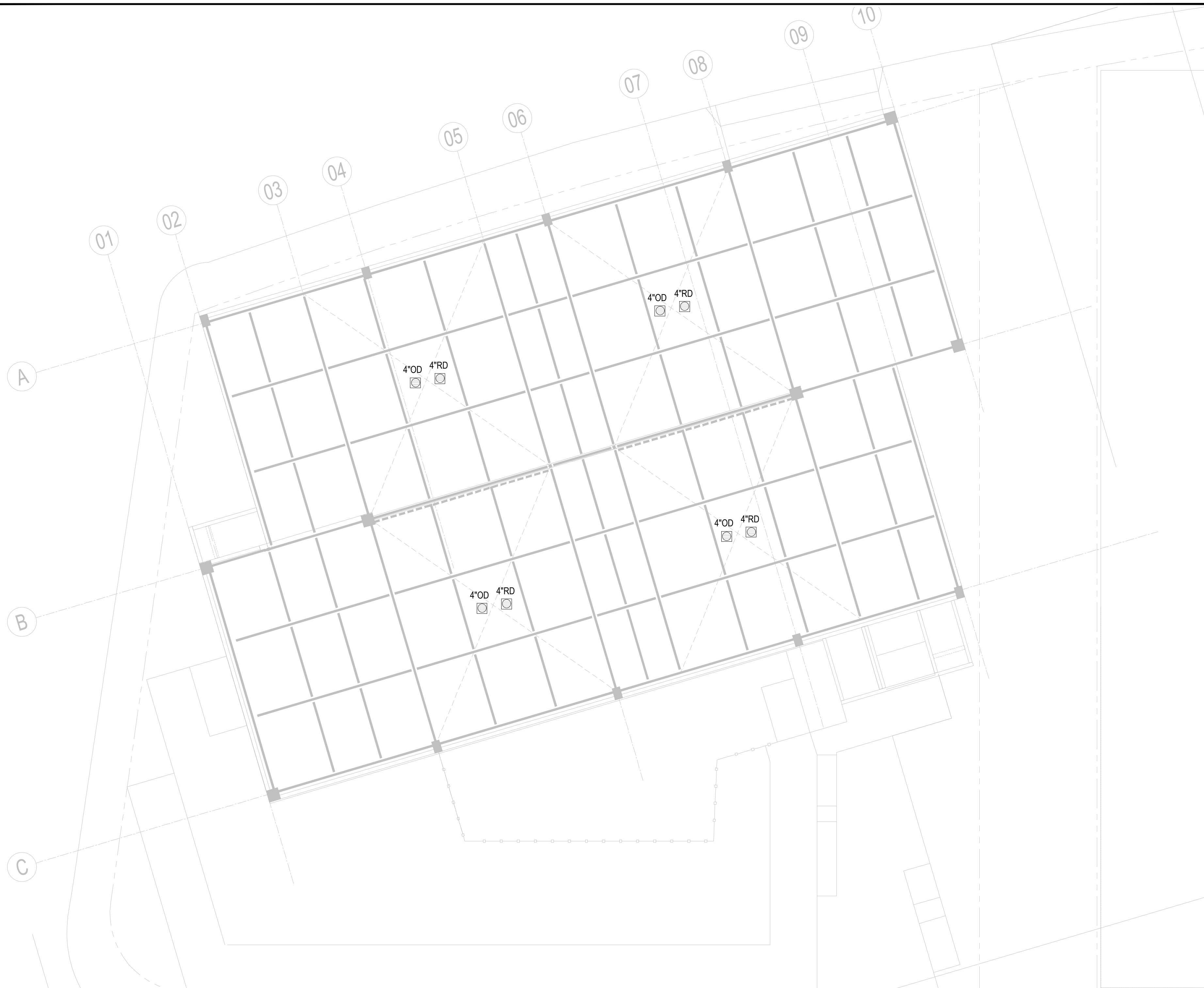
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DRAWING TITLE:  
**PLUMBING ROOF PLAN**

SCALE: 1/16"=1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**P-109**  
DRAWING ORDER: 157 of 205



**01** PLUMBING ROOF PLAN  
1/16" = 1'-0"

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REVISION	DESCRIPTION	DATE

PROJECT: **NYC BBJ**  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:  


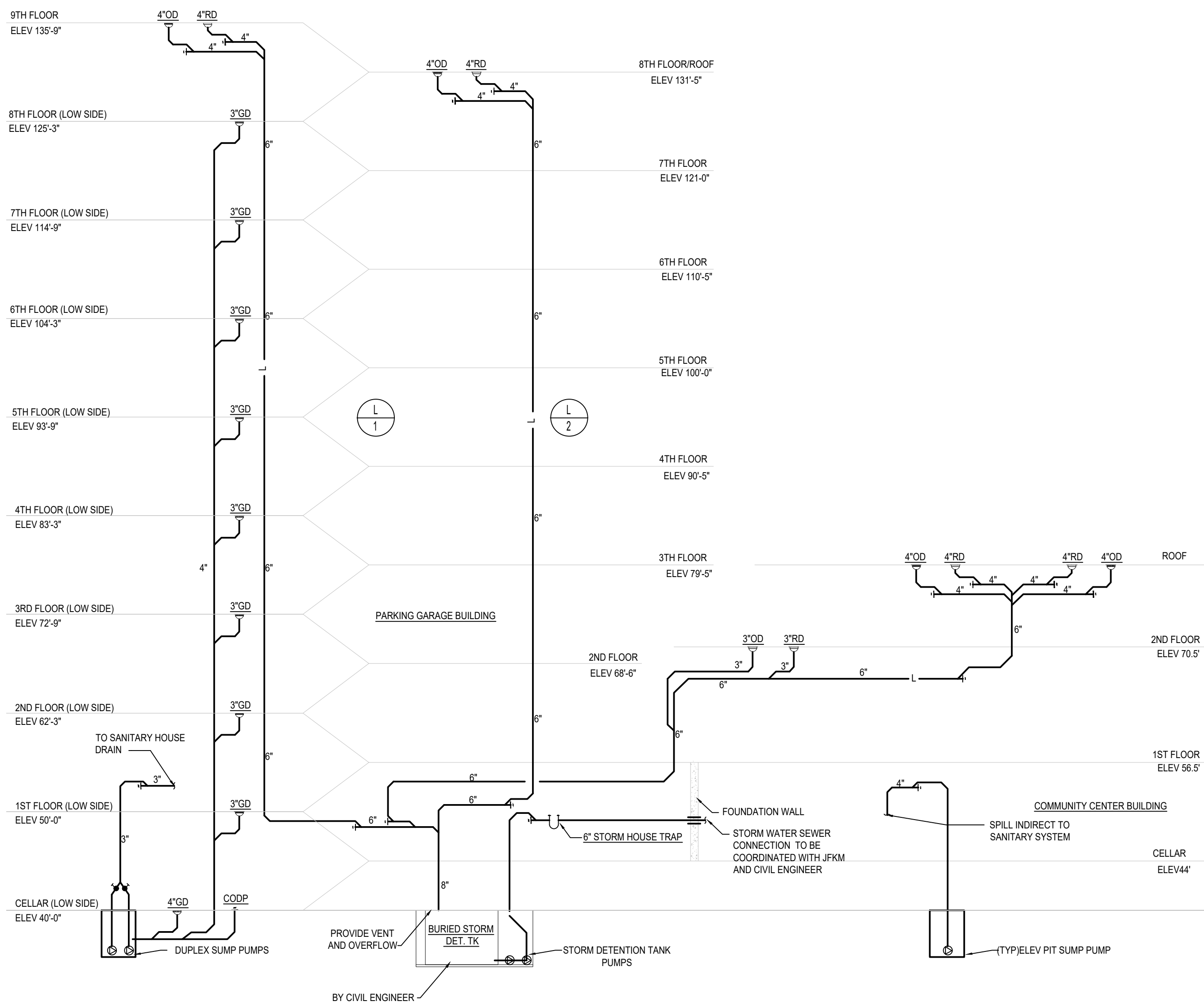
DRAWING TITLE:  
**PLUMBING STORM WATER RISER DIAGRAM**

SCALE: NTS DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**P-301**

DRAWING ORDER: 158 of 205



**STORM WATER RISER DIAGRAM**  
N.T.S

NOTE: FINAL GARAGE DRAIN COUNT TO BE ESTABLISHED IN DESIGN PHASE. DRAINS TO BE LOCATED AT MAIN AND LOW LEVEL RAMP ELEVATION.

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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
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**TECHNICAL DRAWINGS**

KEY PLAN:

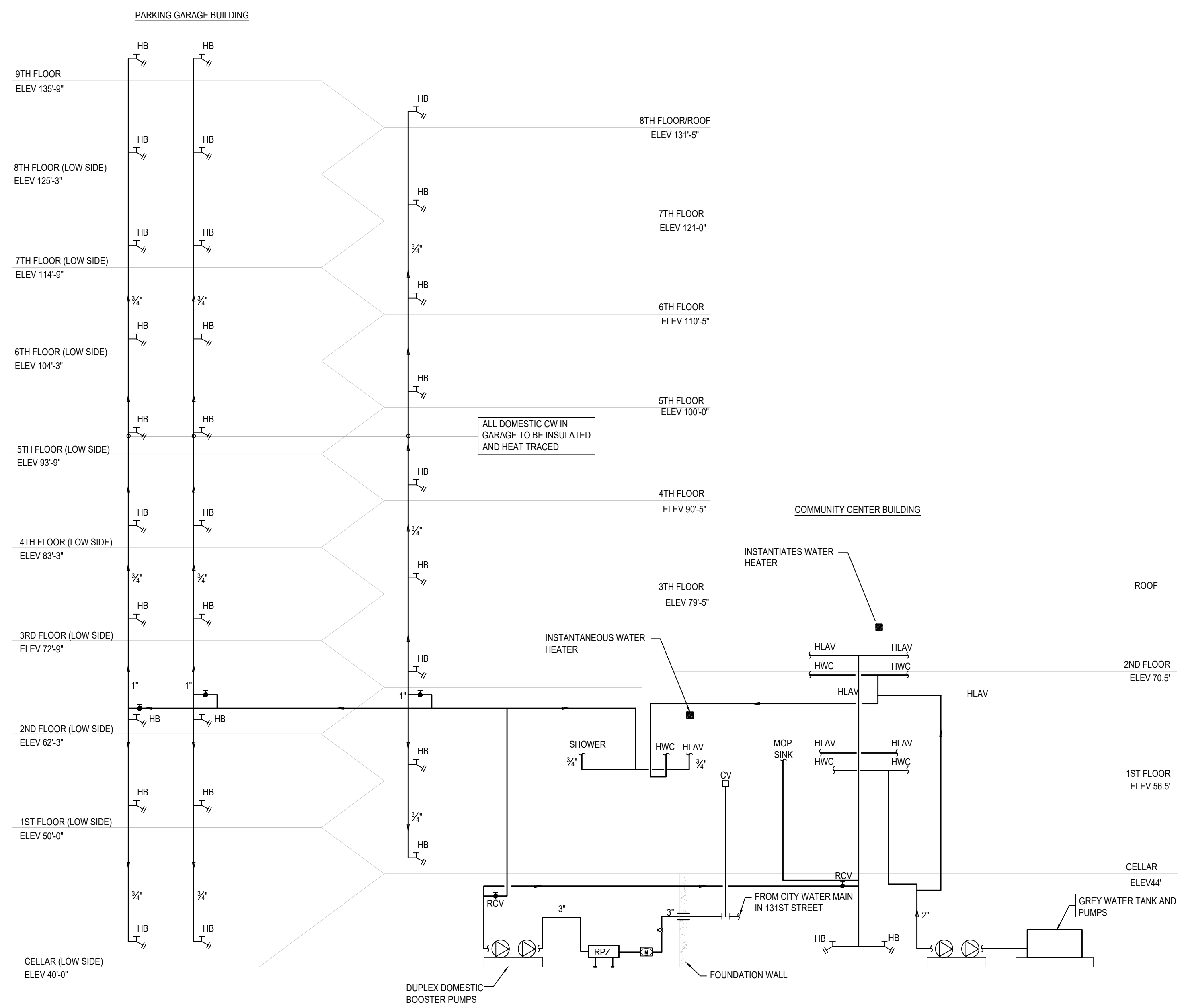
PROJECT NORTH

DRAWING TITLE:  
**PLUMBING DOMESTIC WATER RISER DIAGRAM**

SCALE: NTS DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**P-302**  
DRAWING ORDER: 159 of 205



**DOMESTIC WATER RISER DIAGRAM**  
N.T.S

REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:

PROJECT NORTH

DRAWING TITLE:  
**PLUMBING SANITARY RISER DIAGRAM**

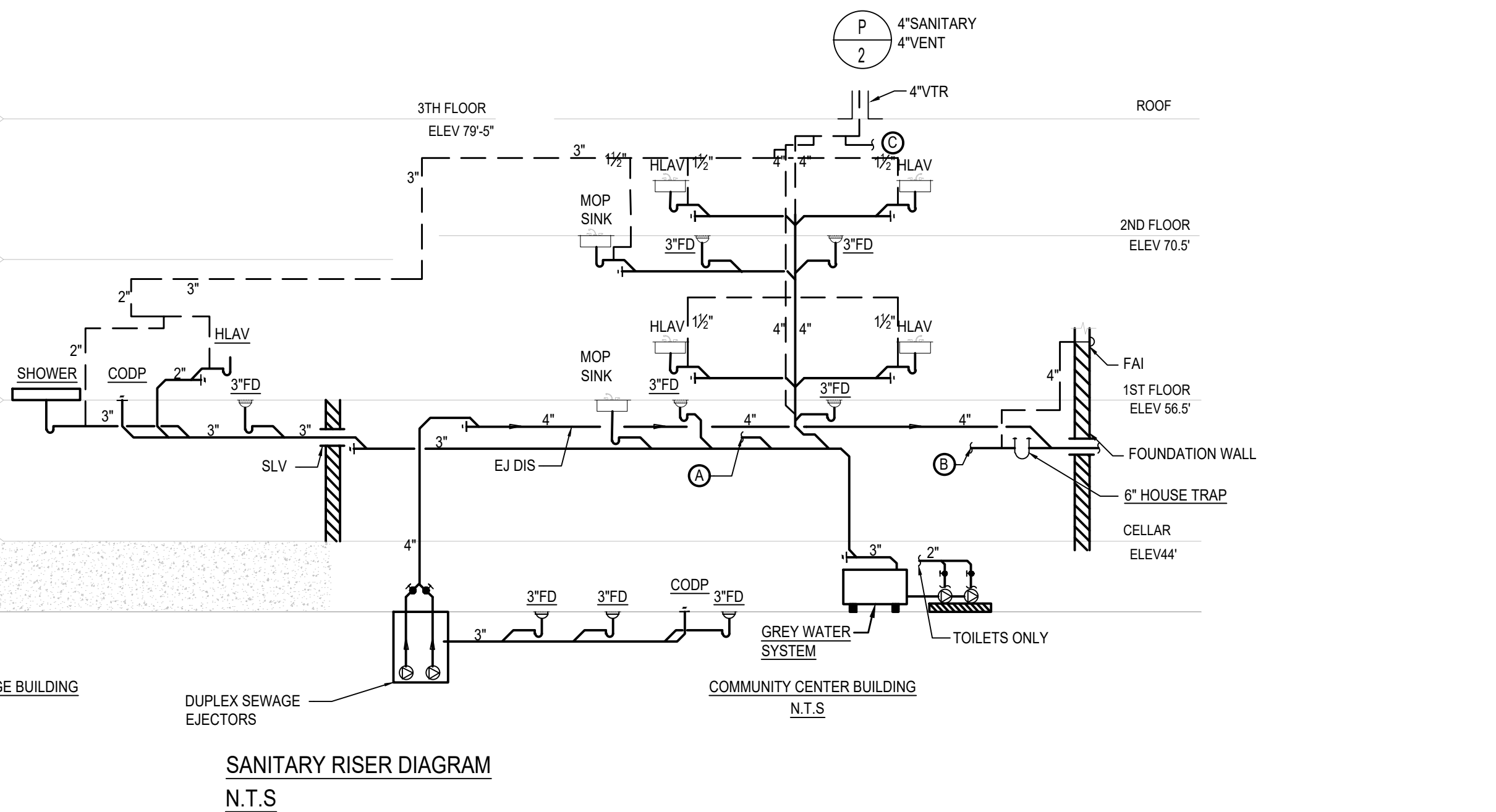
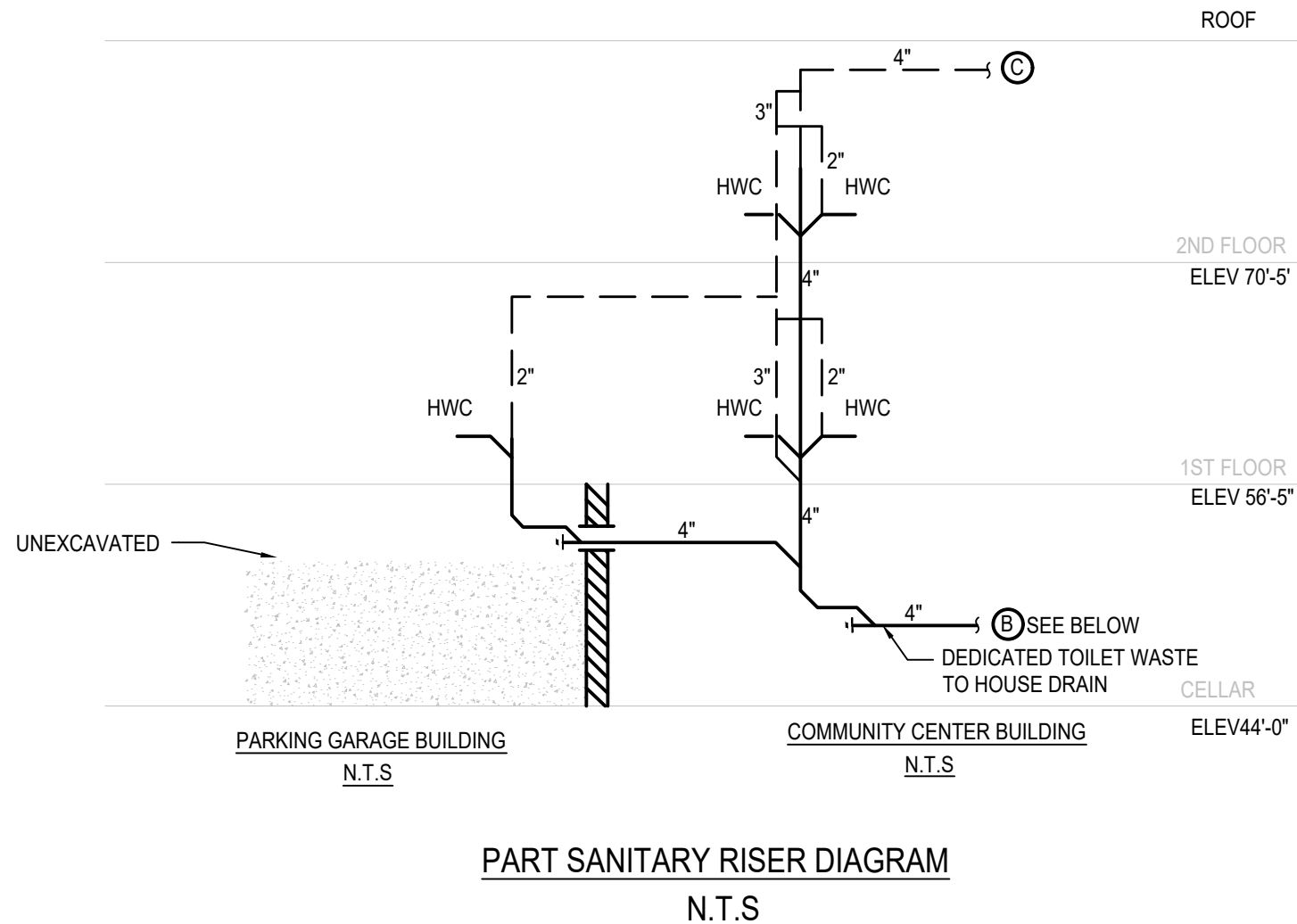
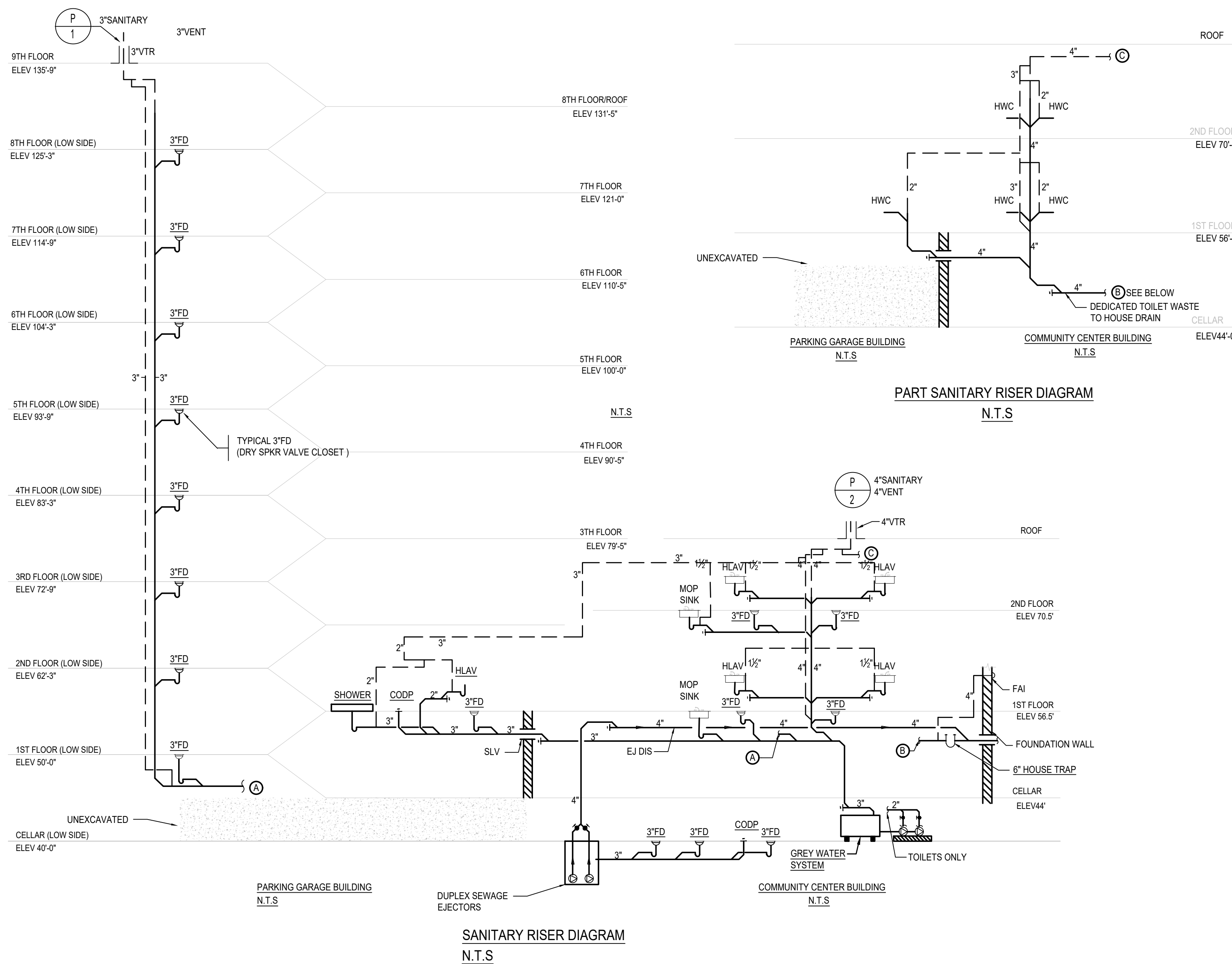
SCALE: NTS DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:

**P-303**

DRAWING ORDER: 160 of 205



**SANITARY RISER DIAGRAM**  
N.T.S

**PART SANITARY RISER DIAGRAM**  
N.T.S

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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
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**TECHNICAL DRAWINGS**

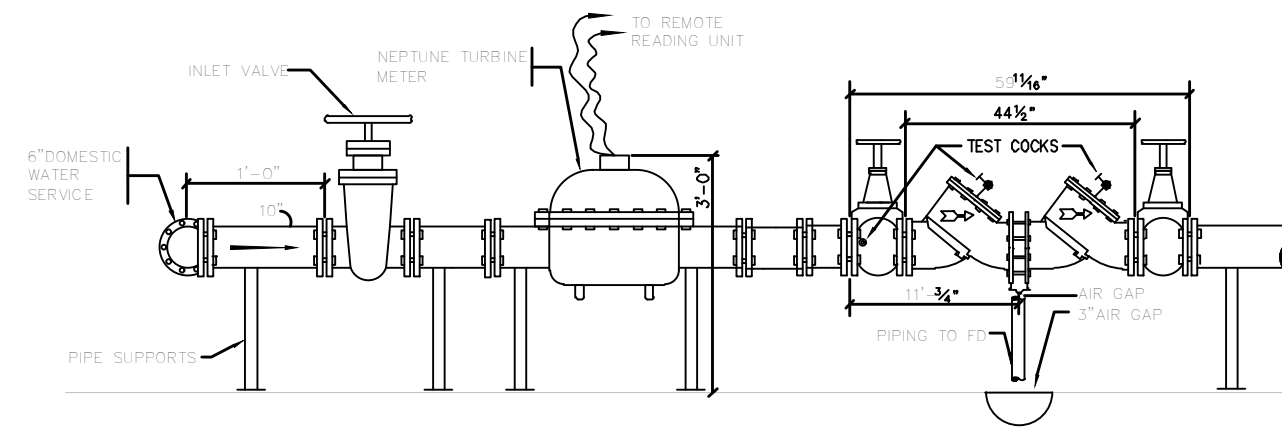
KEY PLAN:  


DRAWING TITLE:  
**PLUMBING DETAILS**

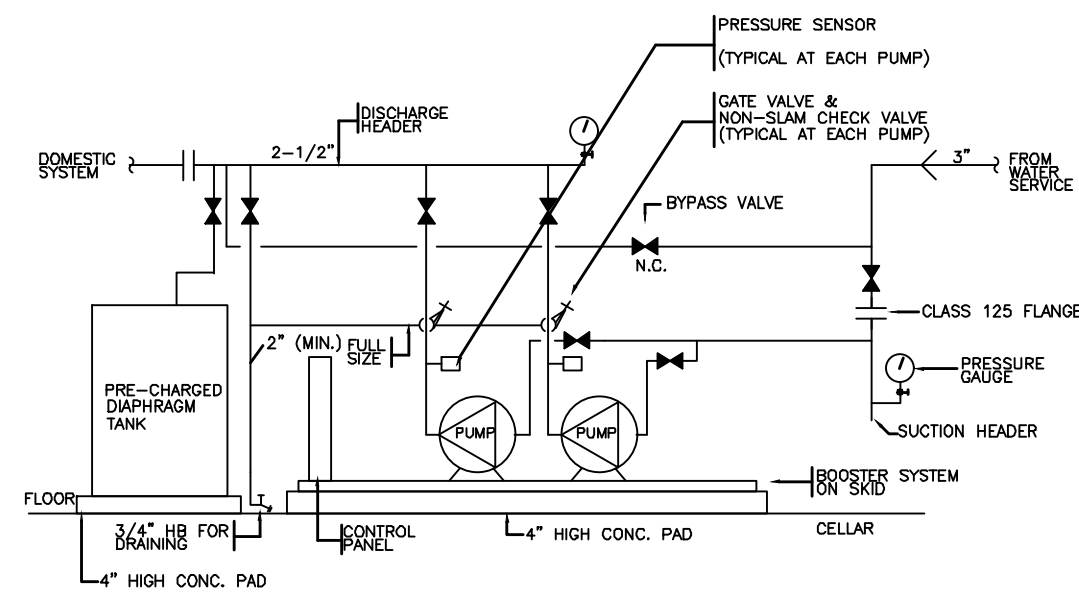
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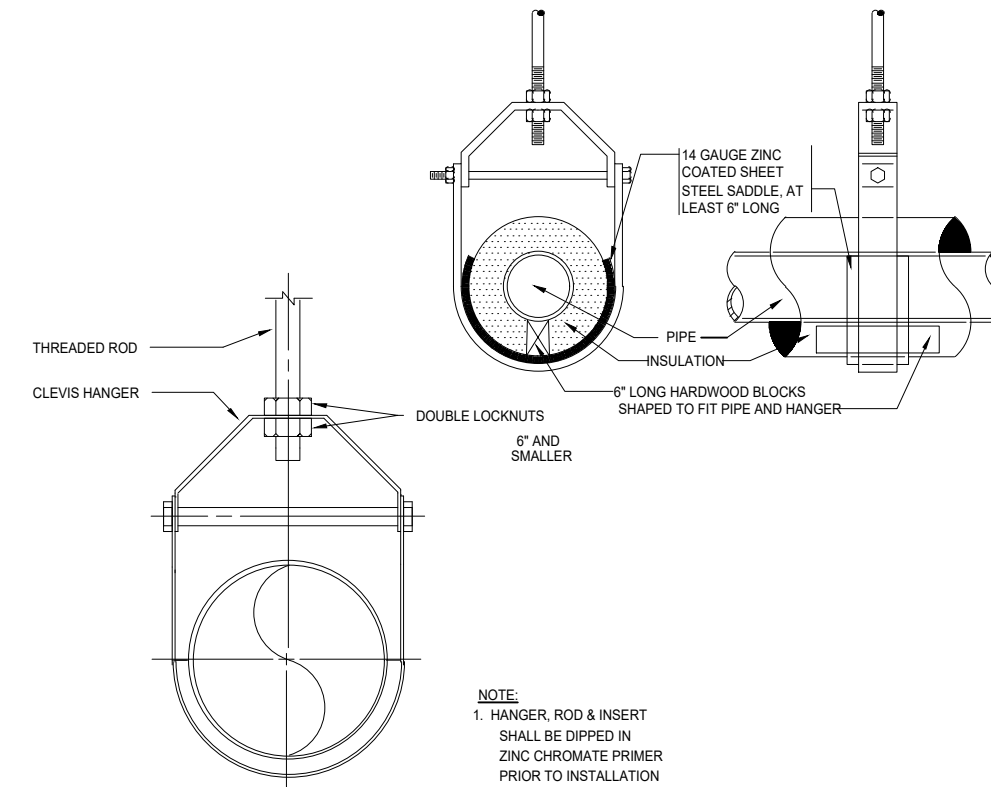
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**P-500**  
DRAWING ORDER: 161 of 205



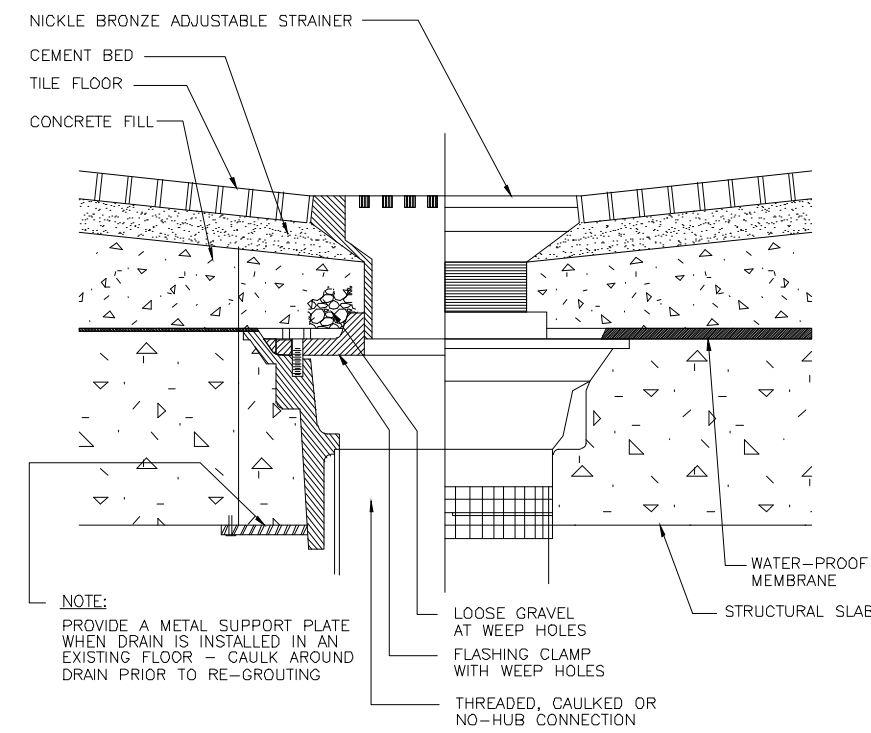
**DOMESTIC WATER METER & RPZ**  
N.T.S.



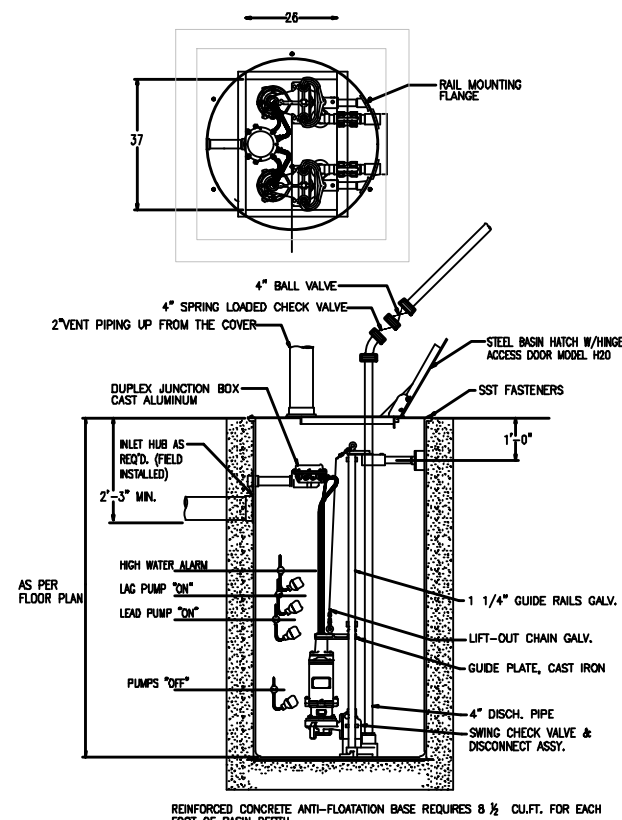
**DUPLEX DOMESTIC BOOSTER PUMP(S)**  
N.T.S.



**TYPICAL PIPE SUPPORT**  
N.T.S.



**FLOOR DRAIN DETAIL**  
N.T.S.



**DUPLEX SEWAGE EJECTOR/ SUMP PUMPS PIT DETAIL**  
N.T.S.

### SPRINKLER LEGEND

	BRANCH SPRINKLER PIPING
	CONCEALED PENDENT SPRINKLER HEAD
	NEW UPRIGHT SPRINKLER HEAD
	NEW SIDEWALL SPRINKLER HEAD
	POINT OF NEW CONNECTION
	CAP
	SPRINKLER CONTROL VALVE ASSEMBLY

### ABBREVIATIONS

F.S.P.	FIRE STANDPIPE
N.I.C.	NOT IN CONTRACT
A.F.F.	ABOVE FINISH FLOOR
C.V.	CHECK VALVE
D.	DRAIN
ELEV.	ELEVATION
F.H.V.	FIRE HOSE VALVE
F.C.A.	SPRINKLER FLOOR CONTROL VALVE ASSEMBLY
F.S.P.	FIRE STANDPIPE
F.S.	FLOW SWITCH
R.C.V.	RISER CONTROL VALVE
SP.	SPRINKLER
T.S.	TAMPER SWITCH
P.A.	PRE-ACTION SYSTEM

### NEW YORK CITY BUILDING

### DEPARTMENT SPRINKLER NOTES

- THE INSTALLATION COMPONENTS, SIZING, SPACING, CLEARANCES, POSITION AND TYPE OF SYSTEMS SHALL CONFORM TO THE NYC 2014 BUILDING CODE APPENDIX Q, SECTION BC Q102 AND SECTION BC 903.
- ONLY APPROVED MATERIALS SHALL BE USED AS PER CHAPTER 6 OF APPENDIX Q, SECTION BC Q102.
- DIRECT CONNECTION OF SPRINKLERS TO THE PUBLIC WATER SYSTEM SHALL CONFORM TO SECTION BC Q102.1 SEE 15.2.1 AND 15.1.1 (f).
- SPRINKLERS SHALL BE PROTECTED AGAINST FREEZING AND INJURY AS PER APPENDIX Q, BC Q102, SEC. 8.15.3 AND 6.2.8.
- INSPECTIONS AND TESTS OF SPRINKLERS SHALL BE CONDUCTED AS PER SEC. 901.5 AND APPENDIX Q, SEC. BC Q102, CH. 16.
- THE OCCUPANCY OF THE AREAS TO BE SPRINKLERED SHALL BE IN ACCORDANCE WITH SECTIONS 5.2 AND A.5.2 OF APPENDIX Q, SECTION BCQ102.
- WATER SUPPLY TEST PIPES AND GAUGES SHALL BE PROVIDED AS PER SECTION 8.16.1 AND 8.16.4 OF APPENDIX Q, SECTION BC Q102.
- PIPING, FITTING, SPECIFICATIONS, PIPE SCHEDULES, SYSTEM TEST PIPES, PROTECTION AGAINST CORROSION, DAMAGE, VALVES, HANGERS, SPRINKLER GUARDS AND SHIELDS SHALL BE AS PER APPENDIX Q, SECTION BC Q102, CHAPTERS 6 AND 9.
- STOCK OF EXTRA SPRINKLERS SHALL BE FURNISHED AS PER SECTION 6.2.9 APPENDIX Q, SECTION BC Q102 (REQUIRED FOR EACH TEMPERATURE RATING).
- SPRINKLER ALARM SHALL BE IN ACCORDANCE WITH SECTION 8.16.1 OF APPENDIX Q, SECTION BC Q102.
- SPACING, LOCATION AND POSITION OF SPRINKLERS WILL BE AS PER SECTION 8 OF APPENDIX Q, SECTION BCQ102.
- ALL BLIND SPACES EXCEEDING 6" IN WIDTH OR DEPTH WHICH CONTAIN COMBUSTIBLE MATERIAL WILL BE SPRINKLERED.
- ALL PIPING PASSING THROUGH WALLS SHALL COMPLY WITH SECTION BC712.
- THERE IS NO HIGH PILED STORAGE AS DEFINED IN SECTION 3-3.12 OF APPENDIX Q, SECTION BC Q102.
- DISTANCE OF SPRINKLERS FROM HEAT SOURCE SHALL BE AS PER TABLES 9.3.2.5 (a) AND 8.3.2.5 (b).
- AS PER SECTION BC903.1.2 PROVIDE DEPARTMENT OF WATER SUPPLY LETTER WITH FLOW TEST DATA IF THERE IS A DIRECT CONNECTION TO THE STREET WATER SUPPLY.
- ALL PIPES PASSING THROUGH FOUNDATION WALLS SHALL BE PROTECTED AS PROVIDED BY SECTION 305.5 OF THE NYC 2014 PLUMBING CODE.
- THIS APPLICATION IS NOT FILED AS A RESULT OF BY THE FIRE COMMISSIONER AS AUTHORIZED BY BS&A TO MODIFY THE CERTIFICATE OF OCCUPANCY NOR IS SUCH ACTION PENDING.
- ALL VALVES SHALL BE IDENTIFIED AS REQUIRED BY SECTION 6-7.4 OF APPENDIX Q, SECTION BC Q102.
- DRAINAGE SHALL CONFORM TO SECTION 8.15.2 OF APPENDIX Q, SECTION BC Q102.
- A ONE PIECE REDUCING FITTING OF GOOD DESIGN SHOULD BE USED WHEREVER A CHANGE IS MADE IN THE SIZE OF PIPE, AS PER SECTION 6.4.6 OF APPENDIX Q, SECTION BCQ102.
- ALL VALVES ON CONNECTIONS TO WATER SUPPLY TO SPRINKLER SHALL BE APPROVED OS&Y OR APPROVED INDICATOR TYPE.
- DRAIN VALVES AND TEST VALVES SHALL BE APPROVED TYPE AS PER SECTION 6.7.3 OF APPENDIX Q, SECTION BC Q102.
- HANGERS SHALL BE SUPPORTED BY WROUGHT IRON U TYPE OR APPROVED ADJUSTABLE HANGERS. HANGERS SHALL BE OF THE TYPE APPROVED FOR USE WITH THE PIPE OR TUBE INVOLVED, AS PER CHAPTER 9 OF APPENDIX Q, SECTION BC Q102.
- PROVISIONS SHALL BE MADE TO FACILITATE FLUSHING SYSTEM PIPING BY PROVIDING FLUSHING CONNECTION CONSISTING OF A CAPPED NIPPLE 4" LONG ON END OF A CROSS MAIN AS PER SECTION 9.14.16 OF APPENDIX Q, SECTION BCQ102.
- SPRINKLER SHALL BE AN APPROVED TYPE AS PER SECTION 8.3 OF APPENDIX Q, SECTION BC Q102.
- TEMPERATURE RATING SHALL COMPLY WITH SECTION 8.3 OF APPENDIX Q, SECTION BC Q102.
- 18" MINIMUM CLEARANCE TO BELOW SPRINKLER DEFLECTOR AS PER SECTION 8.5.6 OF APPENDIX Q, SECTION BC Q102.
- SPACING AND LOCATION OF SPRINKLERS SHALL COMPLY WITH CHAPTER 8 OF APPENDIX Q, SECTION BCQ102.
- SPRINKLER SYSTEM COMPLIES WITH NFPA 13-2002 AS MODIFIED BY APPENDIX Q, SECTION BCQ102.
- SOURCES OF WATER SUPPLY FOR SPRINKLER SYSTEMS AS PER CHAPTER 15 OF APPENDIX Q, SECTION BC Q102.
- PIPE SCHEDULE SYSTEMS SHALL BE IN ACCORDANCE WITH SECTION 14.5 OF APPENDIX Q, SECTION BC Q102.
- AUTOMATIC INTERLOCK CUTOFF SWITCH FOR VENTILATION WILL CONFORM TO CHAPTER 6 OF THE MECHANICAL CODE (APPLICABLE ONLY IF THERE IS AN AIR SYSTEM UTILIZING RECIRCULATED AIR AND REQUIRING A THERMOSTATIC DEVICE).
- HYDRAULICALLY DESIGNED SPRINKLER SYSTEMS SHALL BE IN ACCORDANCE WITH CHAPTER 14 OF APPENDIX Q, SECTION BCQ102.
- MINIMUM BRANCH PIPE SIZE TO BE ONE INCH (1").
- THIS APPLICATION IS MADE ONLY FOR WORK INDICATED ON THE SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELIED UPON OR TO BE CONSIDERED AS BEING APPROVED.
- SPRINKLER SYSTEM IS EXEMPT FROM ENERGY CODE REQUIREMENTS.

### SPRINKLER DESIGN CRITERIA

- THE SPRINKLER SYSTEM IN THIS BUILDING SHALL BE IN ACCORDANCE WITH NYC BUILDING CODE 2014 AND NFPA-13 2007. THE BUILDING OCCUPANCY IS CLASS 'B'.
- OCCUPANCY CRITERIA
  - LIGHT HAZARD- OFFICE SPACE, SEATING AREA, AND CONFERENCE ROOMS DENSITY 0.10 GPM/SQ. FT. OVER MOST HYDRAULICALLY REMOTE 1500 SQ. FT. MAXIMUM COVERAGE PER SPRINKLER HEAD 225 SQ.FT. 52,000 SQ. FT. MAXIMUM AREA LIMITATION.
  - ORDINARY HAZARD GROUP 1 - MECHANICAL AND ELECTRICAL EQUIPMENT ROOMS. DENSITY 0.15 GPM PER SQ. FT OVER MOST HYDRAULICALLY REMOTE 1500 SQ. FT. MAXIMUM COVERAGE PER SPRINKLER HEAD 130 SQ. FT. 52,000 SQ. FT. MAXIMUM AREA LIMITATION.
- MINIMUM PRESSURE AND WATER DISCHARGE:
  - LIGHT HAZARD MINIMUM PRESSURE AT SPRINKLER HEAD 7 PSI OR 14.87 GPM.
  - ORDINARY HAZARD GROUP 1 - MINIMUM PRESSURE AT SPRINKLER HEAD 12.1 PSI OR 19.5 GPM.
- HYDRAULICALLY CALCULATED SYSTEMS SHALL MEET THE FOLLOWING CRITERIA:
  - EXACT LOCATION OF SPRINKLER HEADS IN FINISHED AREAS WITH SUSPENDED CEILINGS SHALL BE AS INDICATED ON ARCHITECTURAL REFLECTED CEILING PLANS WITH HEADS IN CENTER OF TILES.
    - WHENEVER ROLLED GROOVED CONNECTIONS ARE USED, ALLOWANCE FOR ADDITIONAL PRESSURE LOSS AT GROOVES SHALL BE MADE AS FOLLOWS:
      - FOR EACH COUPLING ON STRAIGHT RUN INCLUDING STRAIGHT FLOW THROUGH TEE OR CROSS: ADD 1 EQUIVALENT FOOT OF PIPE.
      - FOR EACH COUPLING AT ELBOW, TEE OR CROSS WHERE DIRECTION OF FLOW CHANGES: ADD 2 EQUIVALENT FEET OF PIPE.
    - EQUIVALENT FITTING LENGTHS USED IN HYDRAULIC CALCULATIONS SHALL BE IN ACCORDANCE WITH NFPA 13-2007 SECTION NO. 22.4.3 AS REFERENCED BY THE NYCBC. WHEREVER FITTINGS ARE USED IN CONJUNCTION WITH SCHEDULE 40 PIPE, EQUIVALENT FITTING LENGTHS INDICATED IN NFPA 13-2007 TABLE 22.4.3.1.1 SHALL BE USED. EQUIVALENT LENGTH FOR INTERNAL PIPE DIAMETERS DIFFERENT FROM SCHEDULE 40 STEEL PIPE SHALL BE MULTIPLIED BY A FACTOR AS PER SEC. 22.4.3.1.3.
  - EACH SPRINKLER IN THE DESIGN AREA AND THE REMAINDER OF THE HYDRAULICALLY DESIGNED SYSTEM SHALL DISCHARGE AT A FLOW RATE AT LEAST EQUAL TO THE STIPULATED MINIMUM WATER APPLICATION RATE (DENSITY) MULTIPLIED BY THE AREA OF SPRINKLER OPERATION. WHERE SPRINKLERS ARE REQUIRED TO DISCHARGE A SPECIFIC FLOW OR PRESSURE RATHER THAN A DENSITY, EACH SPRINKLER IN THE DESIGN AREA SHALL DISCHARGE AT A FLOW OR PRESSURE AT LEAST EQUAL TO THE MINIMUM REQUIRED IN ACCORDANCE WITH NFPA STANDARD NO. 13-2007, PARAGRAPH 22.4.4.6.1, AS REFERENCED BY NYCBC.
  - HYDRAULIC CALCULATIONS SHALL BE BROUGHT BACK TO CONNECTION TO WATER SUPPLY.
- FLOW TEST DATA:
  - CONTRACTOR SHALL OBTAIN FLOW DATA INDICATING RESIDUAL PRESSURES ASSOCIATED WITH BUILDING SYSTEM AND SUBMIT DATA WITH HYDRAULIC CALCULATIONS.
  - THESE HYDRAULIC CALCULATIONS ALONG WITH PUMP OR WATER FLOW TEST ARE TO BE SUBMITTED FOR APPROVAL TO THE ARCHITECT AND TO THE INSURANCE UNDERWRITER. HYDRAULIC CALCULATIONS SHALL BE BROUGHT BACK TO THE LOCATION OF THE PUMP OR WATER FLOW TEST.
  - CONSTRUCTION MAY ONLY BEGIN WHEN APPROVALS ARE GRANTED.
  - RESULT OF HYDRAULIC CALCULATIONS SHALL INDICATE MINIMUM 10% PRESSURE SAFETY MARGIN, I.E., EXCESS OF PRESSURE AVAILABLE OVER PRESSURE REQUIRED.
  - AVAILABLE PRESSURE AT FLOOR:
    - REFER TO RISER DIAGRAM.

### GENERAL NOTES

- VERIFY EXISTING PIPING RUNS AND CONDITIONS WITH THE NEW WORK PRIOR TO START.
- OBTAIN ALL PERMITS AND FILE ALL WORK INCLUDING HYDRAULIC CALCULATION WITH THE NEW YORK CITY BUILDING DEPARTMENT AND OWNERS INSURANCE CARRIER.
- COORDINATE ALL WORK WITH OTHER TRADES PRIOR TO START OF WORK.
- TESTING OF SPRINKLER AND STANDPIPE SYSTEM SHALL BE IN ACCORDANCE WITH NFPA AND NEW YORK CITY BUILDING CODE 2014.
- SPRINKLER HEAD LOCATIONS SHALL BE COORDINATED WITH ARCHITECTURAL REFLECTED CEILING PLANS.
- ALL SPRINKLER HEADS SHALL BE INSTALLED AT CENTER OF CEILING TILES.
- SCHEDULE DRAINDOWN OF EXISTING SPRINKLER SYSTEM WITH OWNER PRIOR TO START OF WORK.
- ALL WORK SHALL BE DONE IN ACCORDANCE WITH NYC ADMINISTRATIVE CODE AND NFPA 13-2007, AS MODIFIED BY APPENDIX Q OF THE NYC BUILDING CODE.
- SPRINKLER HEADS SHALL BE AS PER B.S. & A. NO. 587-75-SA.
- FILE AN APPLICATION FOR A "LETTER OF NO OBJECTION" WITH FDNY FOR THE ALTERATION WORK INDICATING DETAILED SCOPE OF WORK, DATE AND TIME AND THE DURATION OF DISCONNECTION, AND TEMPORARY FIRE PROTECTION MEASURES TO BE PROVIDED IN THE AFFECTED AREA.
- FIRE PUMP ROOM:
  - 2-HOUR RATED FIRE ENCLOSURE
  - PROVISIONS PROVIDED FOR VENTILATION OF ROOM
  - LIGHTING PROVIDED FOR FIRE PUMP ROOM
  - ADEQUATE HEAT PROVIDED TO MAINTAIN TEMPERATURE ABOVE 40 DEGREE FAHRENHEIT
  - ACCESS TO STREET LEVEL PROVIDED
  - NO OTHER MACHINERY LOCATED WITHIN FIRE PUMP ROOM
  - FIRE PUMP PROVIDED WITH SECONDARY POWER SUPPLY (EMERGENCY GENERATOR) WITH AUTOMATIC SWITCHOVER
  - PRESSURE RELIEF VALVE SHALL BE INSTALLED IN THE PUMP DISCHARGE. SUCH RELIEF VALVE SHALL BE SET TO RELIEVE BELOW THE SHUT-OFF HEAD OF THE PUMP, BUT ABOVE THE PRESSURE REQUIRED TO MAINTAIN THE OPERATING PRESSURE AT THE HIGHEST HOSE VALVE.
- SPECIAL INSPECTIONS:
  - SPRINKLER SYSTEM, FIRE RESISTANT PENETRATIONS AND JOINTS AND FINAL - IN ACCORDANCE WITH BC 1704.23
- THE SPRINKLER SYSTEM IS EXEMPT FROM THE ENERGY CONSERVATION CODE.

### SPECIAL INSPECTIONS - NYC ONLY SPRINKLER SYSTEM SPECIAL INSPECTION: BC 1704.21

- NEW SPRINKLER SYSTEMS SHALL BE INSPECTED IN ACCORDANCE WITH NYC BUILDING CODE SECTION 903. THIS CONTRACTOR OR PERMIT HOLDER FOR THE SPRINKLER WORK SHALL PERFORM ALL REQUIRED ACCEPTANCE TESTS, COMPLETE AND SIGN THE APPROPRIATE CONTRACTOR'S MATERIAL AND TEST CERTIFICATES. THE SPECIAL INSPECTOR SHALL WITNESS ALL REQUIRED TESTS AND SHALL VERIFY THAT ALL INSTALLATIONS OF ALL MATERIALS, FITTINGS, HANGERS, ASSEMBLIES AND SIGNAGE ARE IN ACCORDANCE WITH THE APPROVED CONSTRUCTION DOCUMENTS AND THAT THE CONTRACTOR HAS TRANSMITTED REQUIRED MAINTENANCE LITERATURE AND INSTRUCTIONS TO THE OWNER. THE SPECIAL INSPECTOR SHALL VERIFY THAT MATERIAL AND TEST CERTIFICATION FORMS HAVE BEEN TRANSMITTED TO THE FIRE DEPARTMENT AND THE DEPARTMENT OF BUILDINGS.
- THE SPECIAL INSPECTOR SHALL BE HIRED DIRECTLY BY THE OWNER OR THE GENERAL CONTRACTOR. COST FOR THE SPECIAL INSPECTOR SHALL BE INCLUDED AS PART OF THE SPRINKLER CONTRACTOR'S OVERALL BID AND BE BROKEN OUT SO THE OWNER AND OR GENERAL CONTRACTOR CAN HIRE THE SPECIAL INSPECTOR DIRECTLY WITH BROKEN OUT SO THE OWNER AND OR GENERAL CONTRACTOR CAN HIRE THE SPECIAL INSPECTOR DIRECTLY WITH THE FUNDS PROVIDED UNDER THE SPRINKLER CONTRACTOR'S BID.



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212.792.8700

REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

### TECHNICAL DRAWINGS

KEY PLAN:



DRAWING TITLE:  
**FIRE PROTECTION SYMBOL LIST ABBREVIATIONS, NOTE AND SCHEDULES**

SCALE: NTS DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**SP-001**

DRAWING ORDER: 162 of 205

### SPRINKLER HEAD SCHEDULE

TYPE	DESIGNATION	UPRIGHT	PENDENT	CONCEALED PENDENT SPRK. HD.	RECESSED	CONCEALED SIDEWALL	QUICK RESPONSE	EXTENDED COVERAGE	EXIST SPR HD TO BE REMOVED/RELOCATED	EXIST SPRINKLER HD	MANUFACTURER					REMARKS
											VICTAULIC	RELIABLE	GRINNELL	STAR	VIKING	
WET	●			●			●				V3802					K=5.6, 1/2" ORIFICE, 155°F RATING NYC BSA #587-75-SA
WET	○	●					●				V2704					K=5.6, 1/2" ORIFICE, 155°F RATING NYC BSA #587-75-SA
WET	▼				●		●				V2758					K=5.6, 1/2" ORIFICE, 155°F RATING NYC BSA #587-75-SA
DRY	○D	●					●				VK160					K=5.6, 1/2" ORIFICE, 155°F RATING NYC BSA #587-75-SA
EXT	●EC			●			●	●			V3802					K=5.6, 1/2" ORIFICE, 155°F RATING NYC BSA #587-75-SA

- NOTES:
- EXPOSED UPRIGHT HEADS IN OCCUPIED SPACES SHALL BE CHROME FINISH.
  - PROVIDE ESCUTCHEONS WHEN PENETRATING EXPOSED WALL.
  - PROVIDE SPRINKLER GUARDS AT ALL HEADS 7'-0" AND LOWER.
  - COLOR SELECTION BY OWNER.



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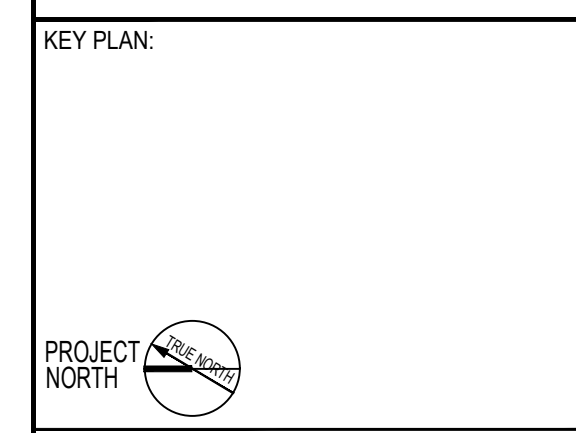
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134 West 37th Street New York, NY 10018  
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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:



PROJECT NORTH 

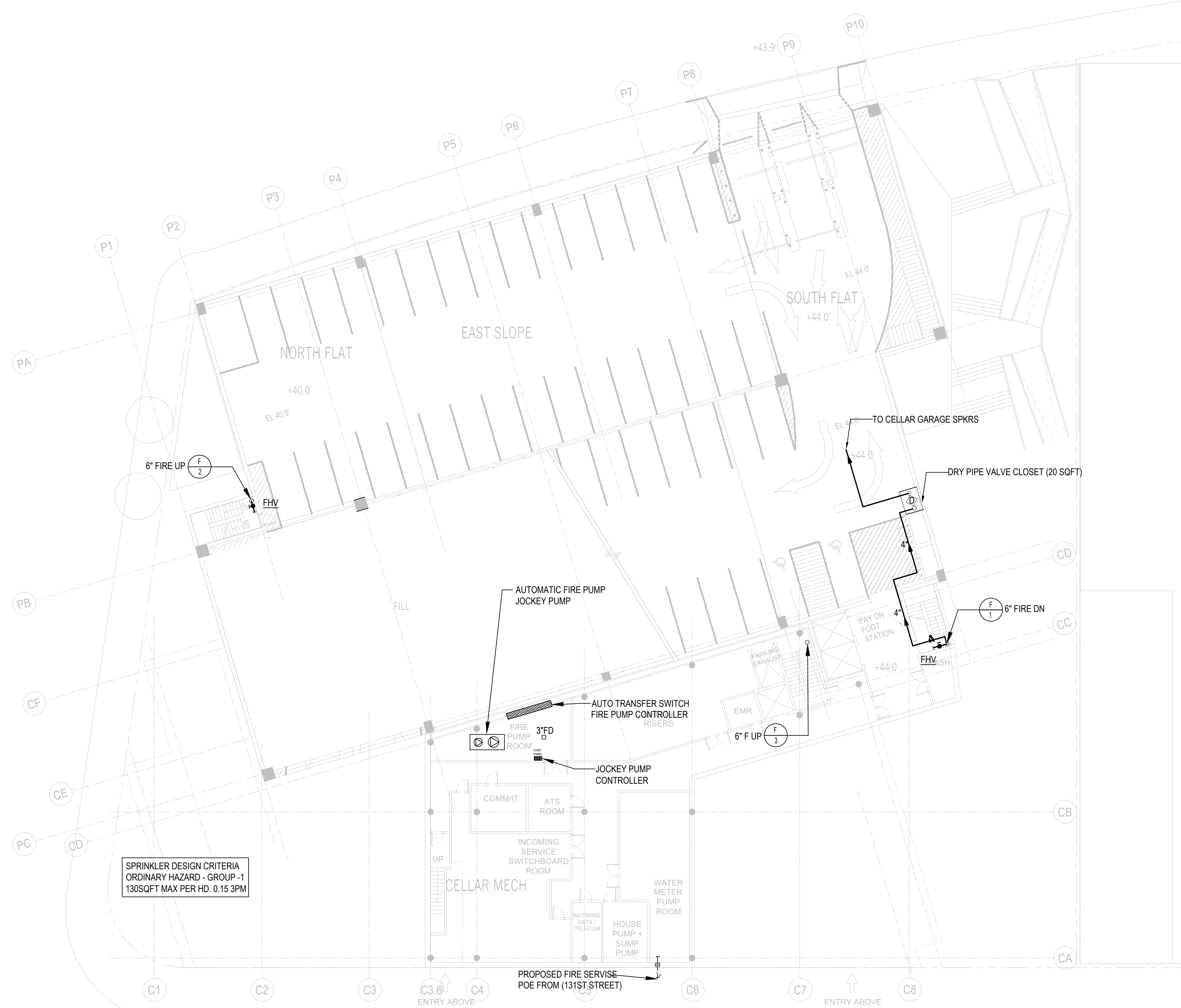
DRAWING TITLE:  
**FIRE PROTECTION CELLAR PLAN**

SCALE: 1/16"=1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**FP-100**

DRAWING ORDER: 163 of 205



SPRINKLER DESIGN CRITERIA  
ORDINARY HAZARD - GROUP -1  
130SQFT MAX PER HD. 0.15 3PM

**01** FIRE PROTECTION CELLAR FLOOR PLAN  
1/16" = 1'-0"

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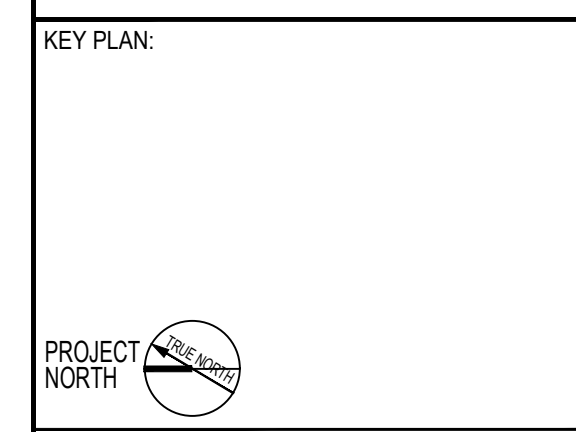
JFK&M ENGINEERS, LLP  
134 West 37th Street New York, NY 10018  
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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:



PROJECT NORTH

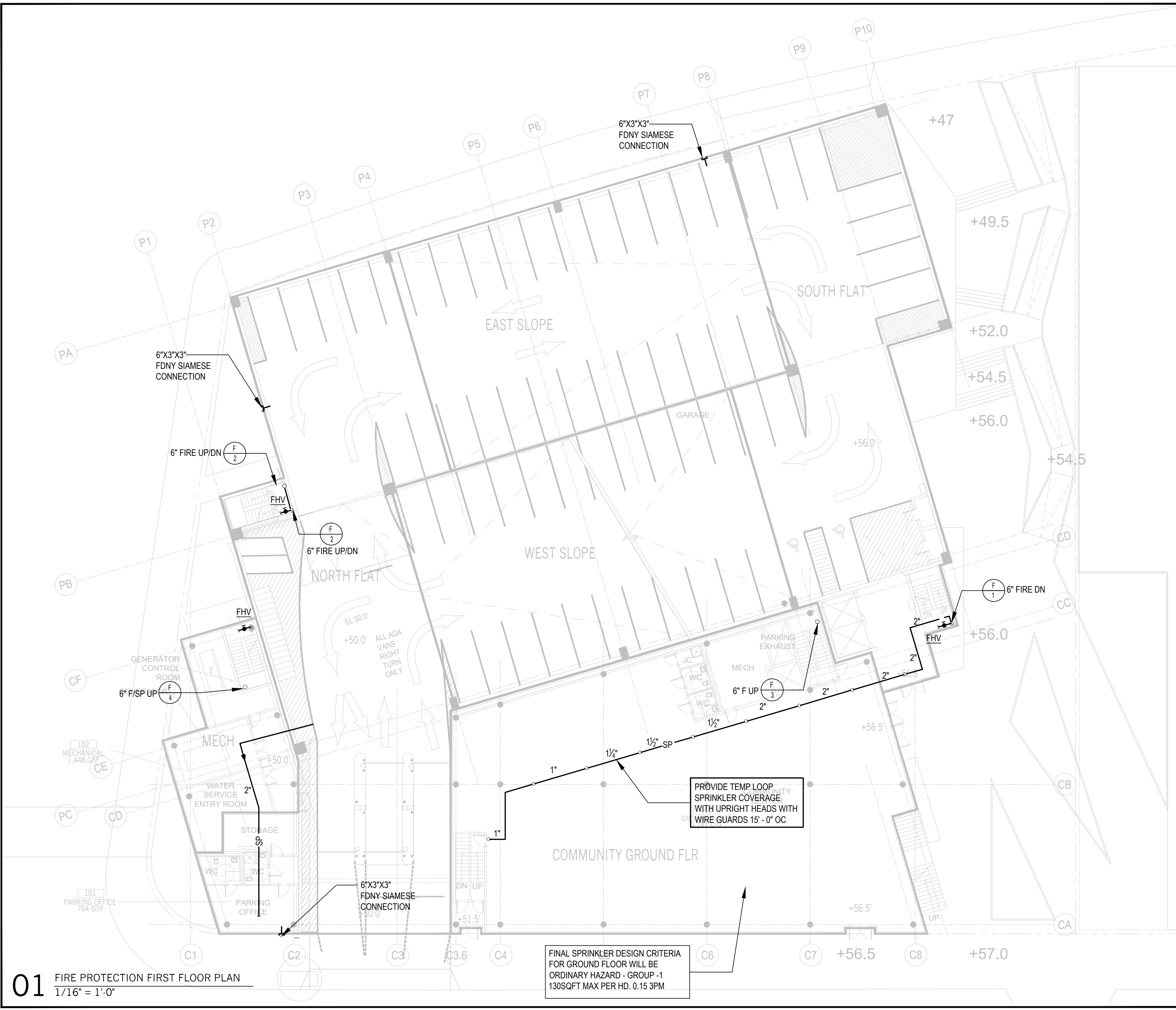
DRAWING TITLE:  
**FIRE PROTECTION FIRST FLOOR PLAN**

SCALE: 1/16"=1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**FP-101**

DRAWING ORDER: 164 of 205



**01** FIRE PROTECTION FIRST FLOOR PLAN  
1/16" = 1'-0"

FINAL SPRINKLER DESIGN CRITERIA FOR GROUND FLOOR WILL BE ORDINARY HAZARD - GROUP -1 130SQFT MAX PER HD. 0.15 3PM

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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:

PROJECT NORTH

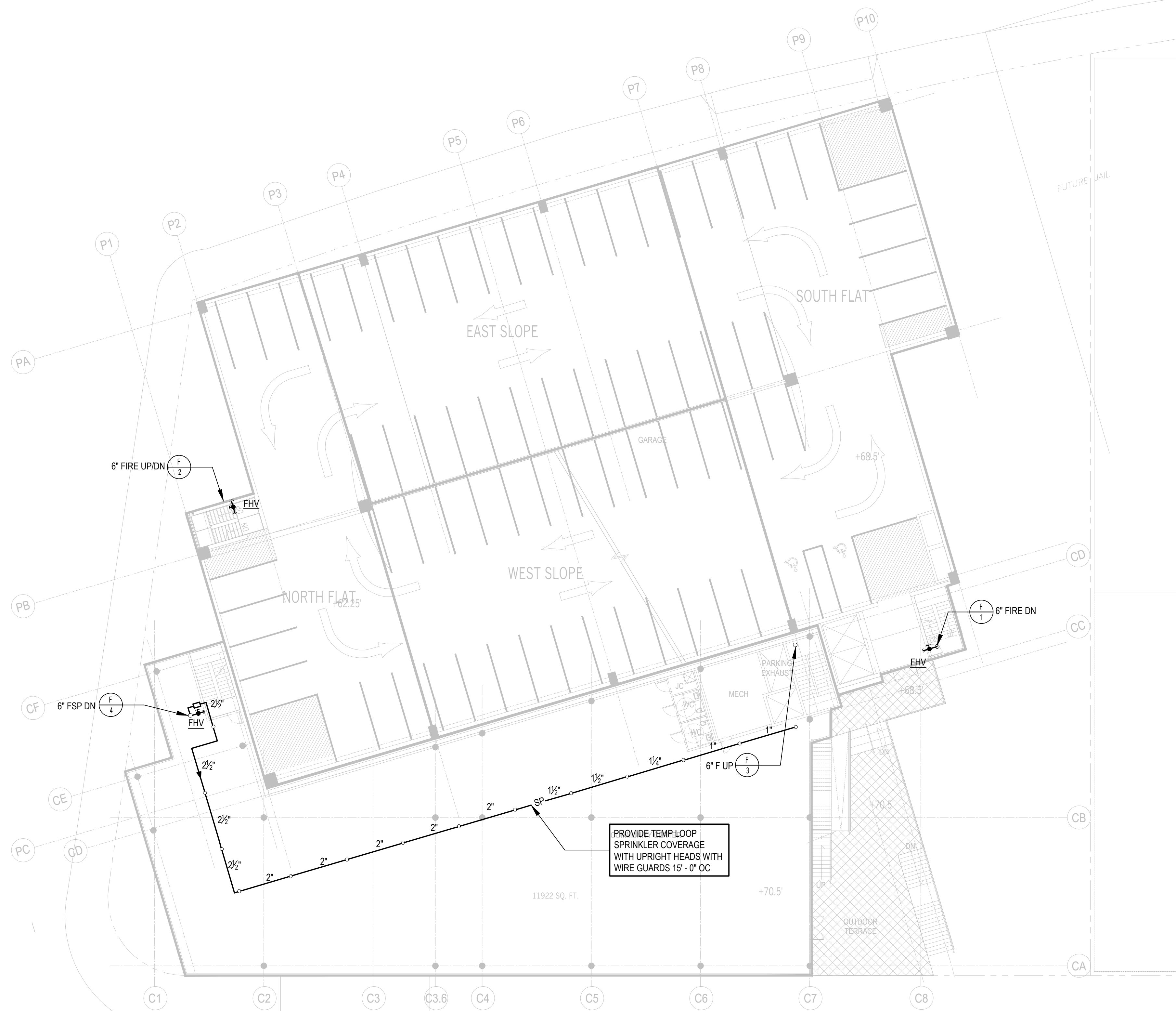
DRAWING TITLE:  
**FIRE PROTECTION SECOND FLOOR PLAN**

SCALE: 1/16"=1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**FP-102**

DRAWING ORDER: 165 of 205



**01** FIRE PROTECTION SECOND FLOOR PLAN  
1/16" = 1'-0"

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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:

PROJECT NORTH

DRAWING TITLE:  
**FIRE PROTECTION  
THIRD FLOOR  
PLAN**

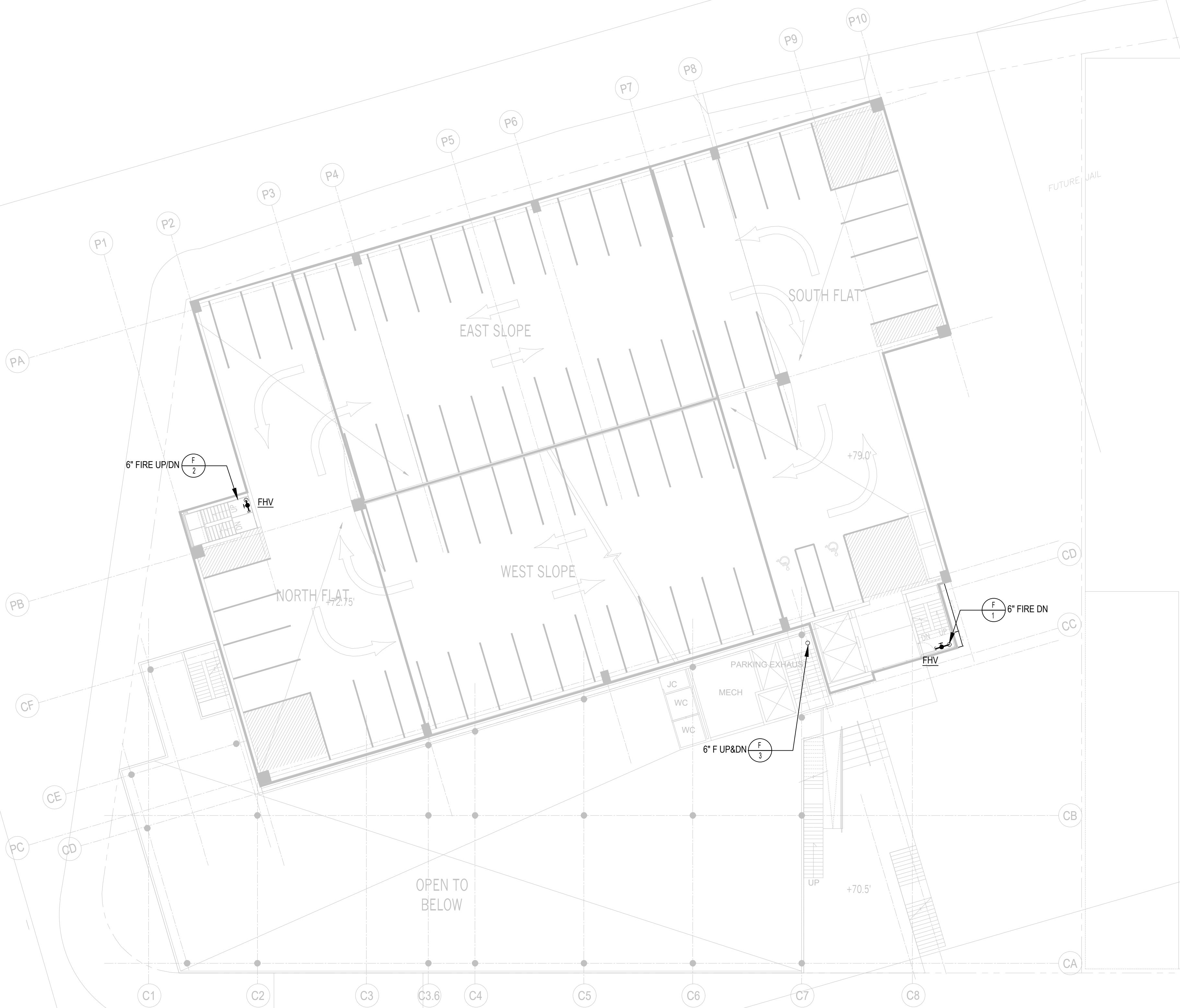
SCALE: 1/16"=1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:

**FP-103**

DRAWING ORDER: 166 of 205



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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:

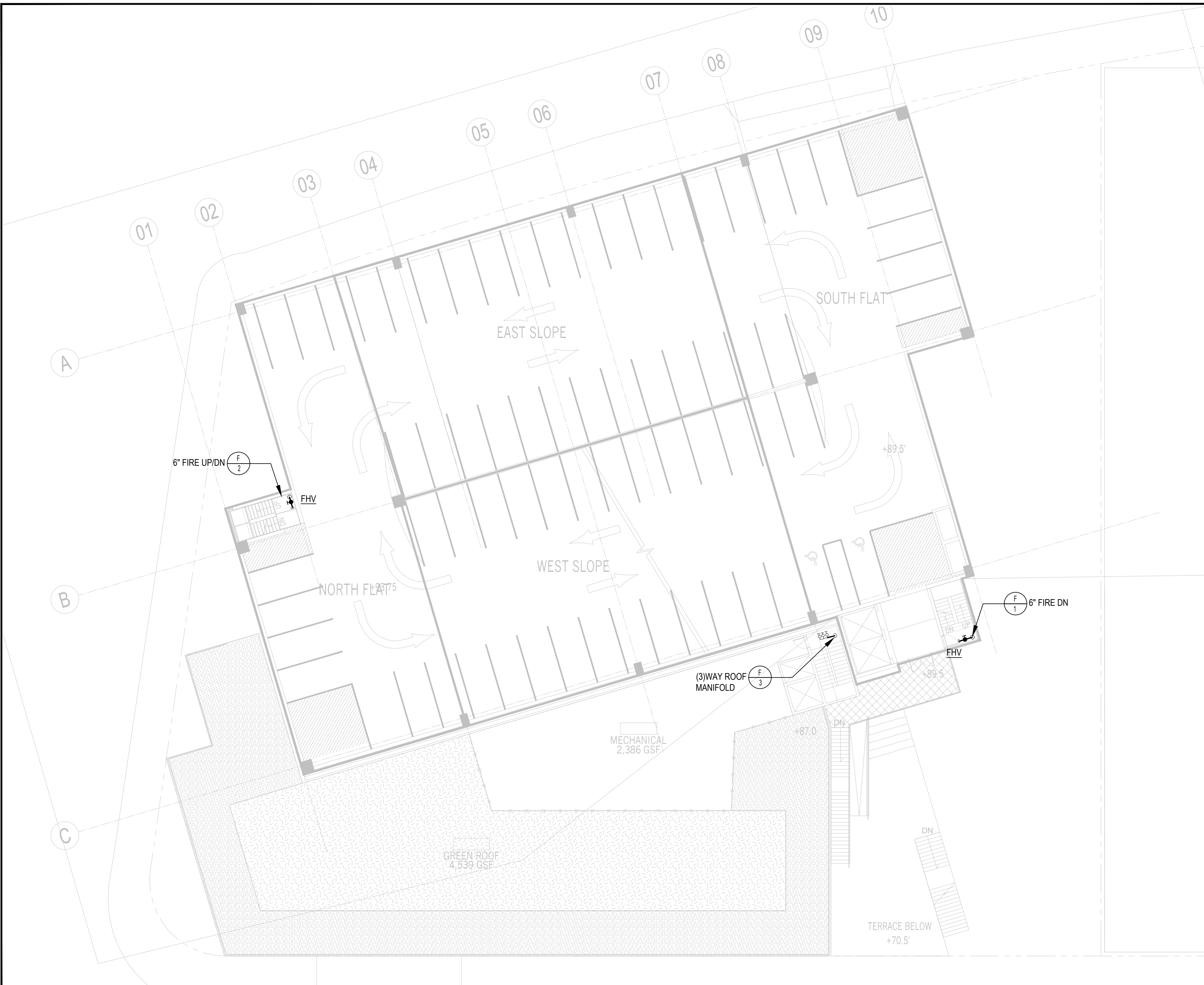
PROJECT NORTH 

DRAWING TITLE:  
**FIRE PROTECTION  
FOURTH FLOOR  
PLAN**

SCALE: 1/16"=1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**FP-104**  
DRAWING ORDER: 167 of 205



**01** FIRE PROTECTION FOURTH FLOOR PLAN  
1/16" = 1'-0"

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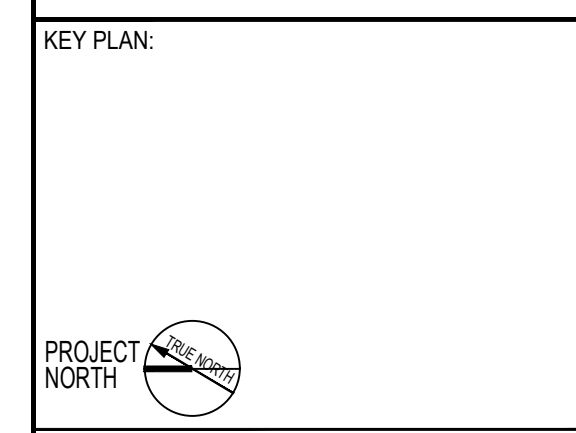
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134 West 37th Street New York, NY 10018  
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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:



PROJECT NORTH 

DRAWING TITLE:  
**FIRE PROTECTION FIFTH FLOOR PLAN**

SCALE: 1/16"=1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**FP-105**  
DRAWING ORDER: 168 of 205



**01** FIRE PROTECTION FIFTH FLOOR PLAN  
1/16" = 1'-0"

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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:

PROJECT NORTH 

DRAWING TITLE:  
**FIRE PROTECTION  
SIXTH FLOOR  
PLAN**

SCALE: 1/16"=1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**FP-106**  
DRAWING ORDER: 169 of 205



**01** FIRE PROTECTION SIXTH FLOOR PLAN  
1/16" = 1'-0"

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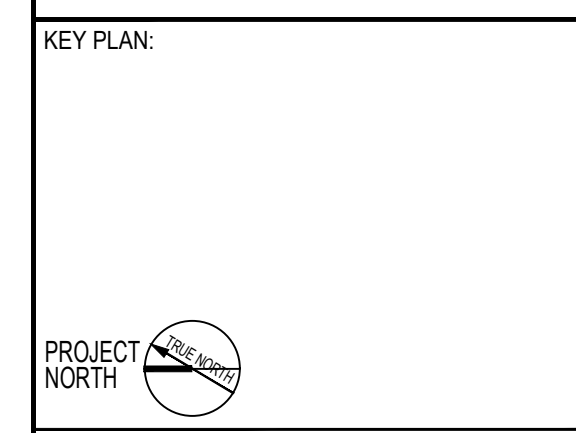
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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:  


PROJECT NORTH   
DRAWING TITLE:  
**FIRE PROTECTION SEVENTH FLOOR PLAN**

SCALE: 1/16"=1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**FP-107**  
DRAWING ORDER: 170 of 205



**01** FIRE PROTECTION SEVENTH FLOOR PLAN  
1/16" = 1'-0"



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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:  
  
PROJECT NORTH 

DRAWING TITLE:  
**FIRE PROTECTION EIGHTH FLOOR PLAN**

SCALE: 1/16"=1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**FP-108**  
DRAWING ORDER: 171 of 205



**01** FIRE PROTECTION EIGHTH FLOOR PLAN  
1/16" = 1'-0"

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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

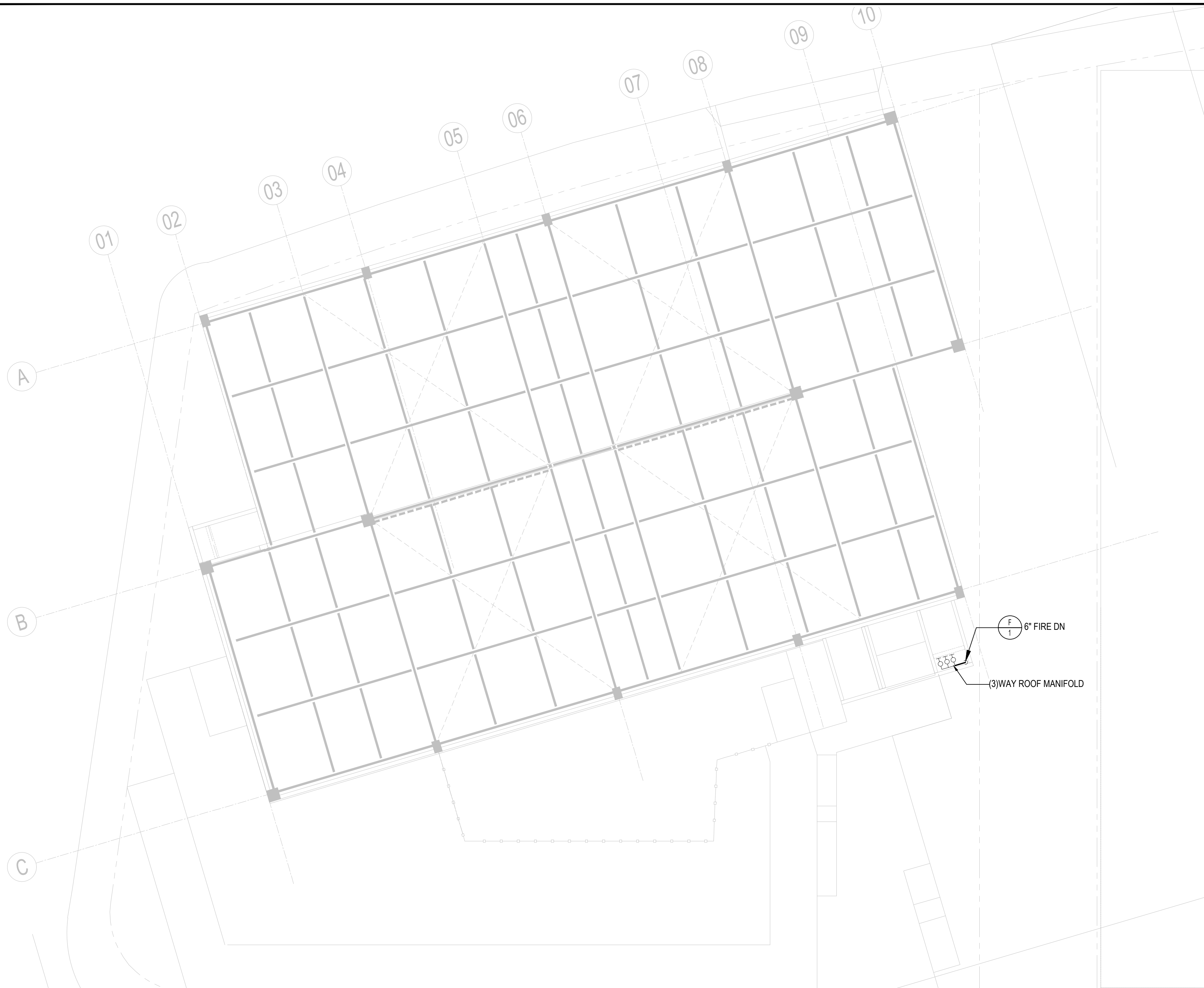
KEY PLAN:  
  
PROJECT NORTH 

DRAWING TITLE:  
**FIRE PROTECTION ROOF PLAN**

SCALE: 1/16"=1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**FP-109**  
DRAWING ORDER: 172 of 205



**01** FIRE PROTECTION ROOF PLAN  
1/16" = 1'-0"

REVISION	DESCRIPTION	DATE

PROJECT: **NYC BBJ  
QUEENS GARAGE &  
COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL  
DRAWINGS**

KEY PLAN:

PROJECT NORTH

DRAWING TITLE:  
**FIRE PROTECTION  
RISER DIAGRAM**

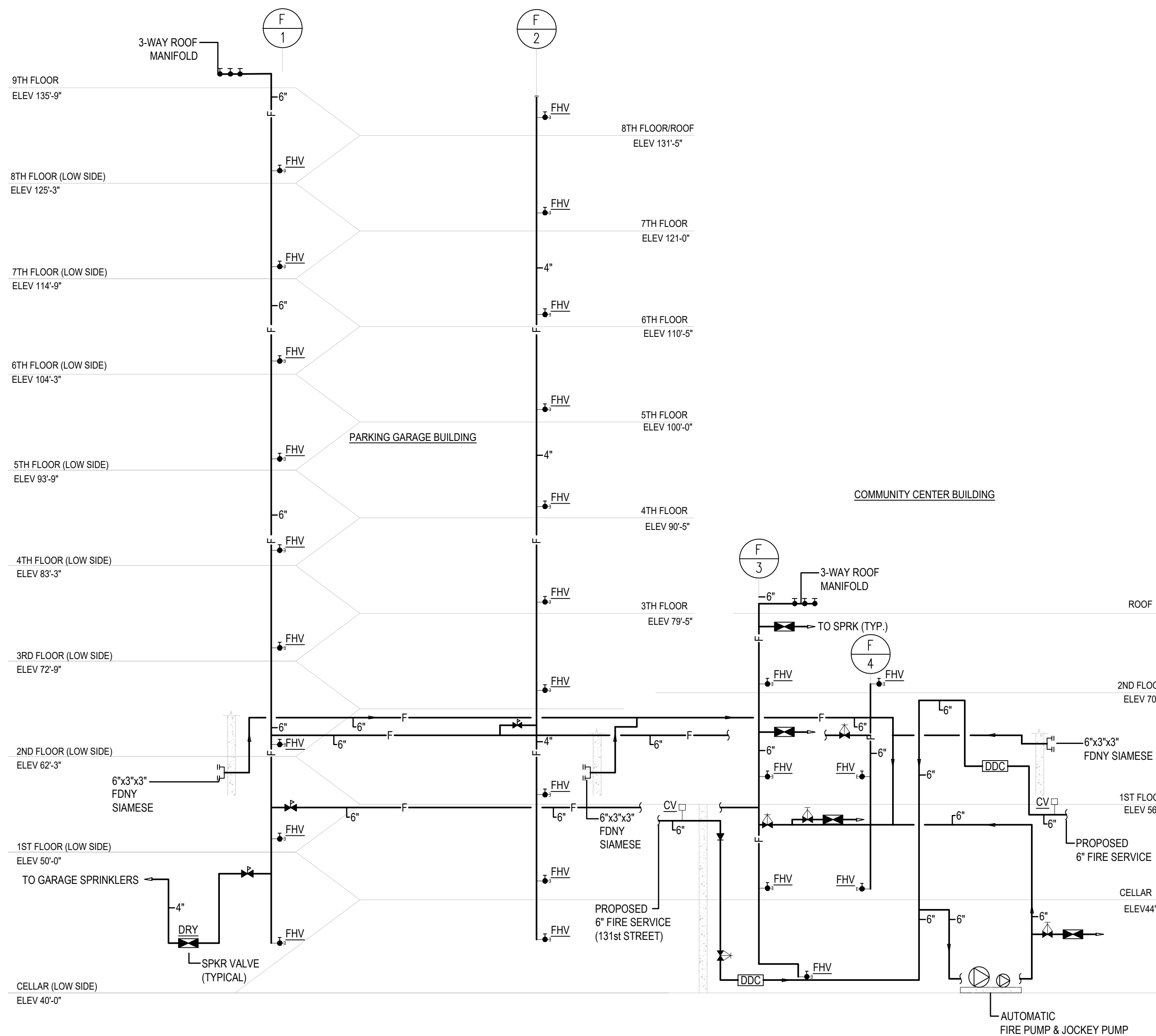
SCALE: NTS DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:

**FP-300**

DRAWING ORDER: 173 of 205



**FIRE PROTECTION RISER DIAGRAM**  
**N.T.S**

REVISION	DESCRIPTION	DATE

PROJECT: **NYC BBJ  
QUEENS GARAGE &  
COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL  
DRAWINGS**

KEY PLAN:  
  
PROJECT NORTH

DRAWING TITLE:  
**FIRE  
PROTECTION  
SCHEDULES AND  
DETAILS**

SCALE: NTS DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**FP-500**  
DRAWING ORDER: 174 of 205

**FIRE PUMP SCHEDULE**

EQUIPMENT	LOCATION	QUANTITY		MOTOR			RATED CAP. GPM	HEAD FT.	MANU. MODEL	
		TOTAL	EMERG.	HP	RPM	VOLTS				PH
AUTOMATIC FIRE PUMP	CELLAR	1	X	67	-	460	3	750	-	Peerless Model: ( )
JOCKEY PUMP	CELLAR	1	X	3	-	460	3	5	-	GRUNDFOS MODEL ( )

1. PROVIDE AUTOMATIC FIRE PUMP PANEL MODEL#FTA( ), TRANSFER SWITCH FTA( )
2. FIRE PUMP TO MEET THE REQUIREMENTS OF NFPA 13 MODIFIED BY BC APPENDIX Q SECTION 15.2.2.4.
3. BUILDING IS NOT SEISMIC.

**FIRE PROTECTION EQUIPMENT AND SERVICES CALCULATION**

(750 GPM) AUTOMATIC FIRE PUMP

Estimated available street pressure= (38 PSI)

Adjusted Fire Pump suction pressure after service losses = (23 psi)

Highest hose = 75psi/173', Static =97', Friction = 12'

282' less 53' Available at pump suction = (230')

750 GPM X 230' / 2574 = 67HP

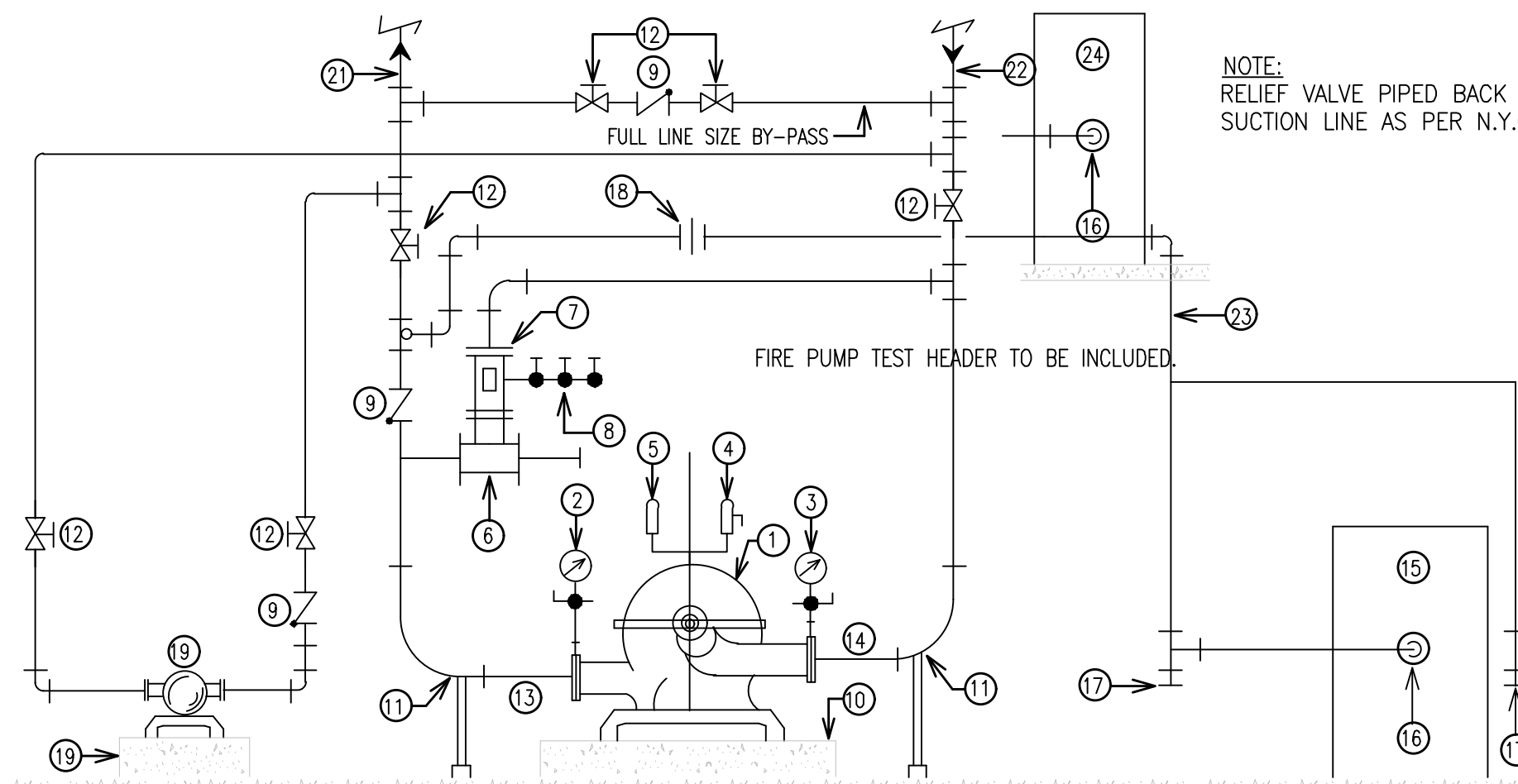
'Provide 75HP, 460V, 3PH, 750 GPM Automatic Fire Pump'

'Provide 3HP Fire Jockey Pump'

'Provide Auto Transfer Switch'

Per NYC Fire code and Appendix Q this building Occupancy Classification shall be provided with (2) dedicated 6" Fire Services from separate city Street mains. Services shall be provided with NYC/DEP Approved Double Check Detectors and cross connected to suction side of Automatic Fire Pump. Building shall be provided with code required FDNY combined Standpipe/Sprinkler Siamese connections where required around building perimeter. Fire pump test header shall be piped to exterior at grade. Fire pump to be on Emergency Power and include auto transfer switch.

NOTE: CALCULATIONS PROVIDED HEREIN BASED UPON "ESTIMATED AVAILABLE" CITY WATER MAIN STREET PRESSURE.



**SYSTEM COMPONENTS**

- |  |   |
|--|---|
| ① AUTOMATIC FIRE PUMP  | ⑬ CONCENTRIC DISCHARGE INCREASER<br>(HOSE VALVE HEADER MAY BE INSTALLED<br>IN THIS LOCATION IF DESIRED) |
| ② DISCHARGE GAUGE  | ⑭ ECCENTRIC SUCTION REDUCER   |
| ③ SUCTION GAUGE  | ⑮ CONTROL PANEL W/ TRANSFER SWITCH  |
| ④ CASING RELIEF VALVE<br>PIPE DISCHARGE TO F.D.  | ⑯ PRESSURE SWITCH   |
| ⑤ AIR RELIEF VALVE   | ⑰ PLUG OR PETCOCK   |
| ⑥ MAIN RELIEF VALVE  | ⑱ GROUND FACE UNION - NON CORROSIVE<br>DIAPHRAGM 3/4"ORIFICE  |
| ⑦ SIGHT CONE & GLASS   | ⑲ JOCKEY PUMP   |
| ⑧ TEST VALVES  | ⑳ CONCRETE BASE   |
| ⑨ CHECK VALVE (USE SPRING<br>CHECK IN VERTICAL OR SWING<br>CHECK IN HORIZONTAL POSITION) | ㉑ DISCHARGE TO SYSTEM   |
| ⑩ CONCRETE BASE MIN. 12" HIGH  | ㉒ SUCTION SUPPLY  |
| ⑪ SUPPORT ELBOW  | ㉓ COPPER OR BRASS 1/2"PIPE SIZE   |
| ⑫ OS & Y GATE VALVE W/ TAMPER<br>SWITCH  | ㉔ JOCKEY PUMP CONTROLLER  |

**AUTOMATIC FIRE AND JOCKEY PUMP**  
N.T.S.

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212.530.9300

JFK&M ENGINEERS, LLP  
134 West 37th Street, New York, NY 10018  
212.792.8700

REVISION	DESCRIPTION	DATE

PROJECT: **NYC BBJ**  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:

PROJECT NORTH

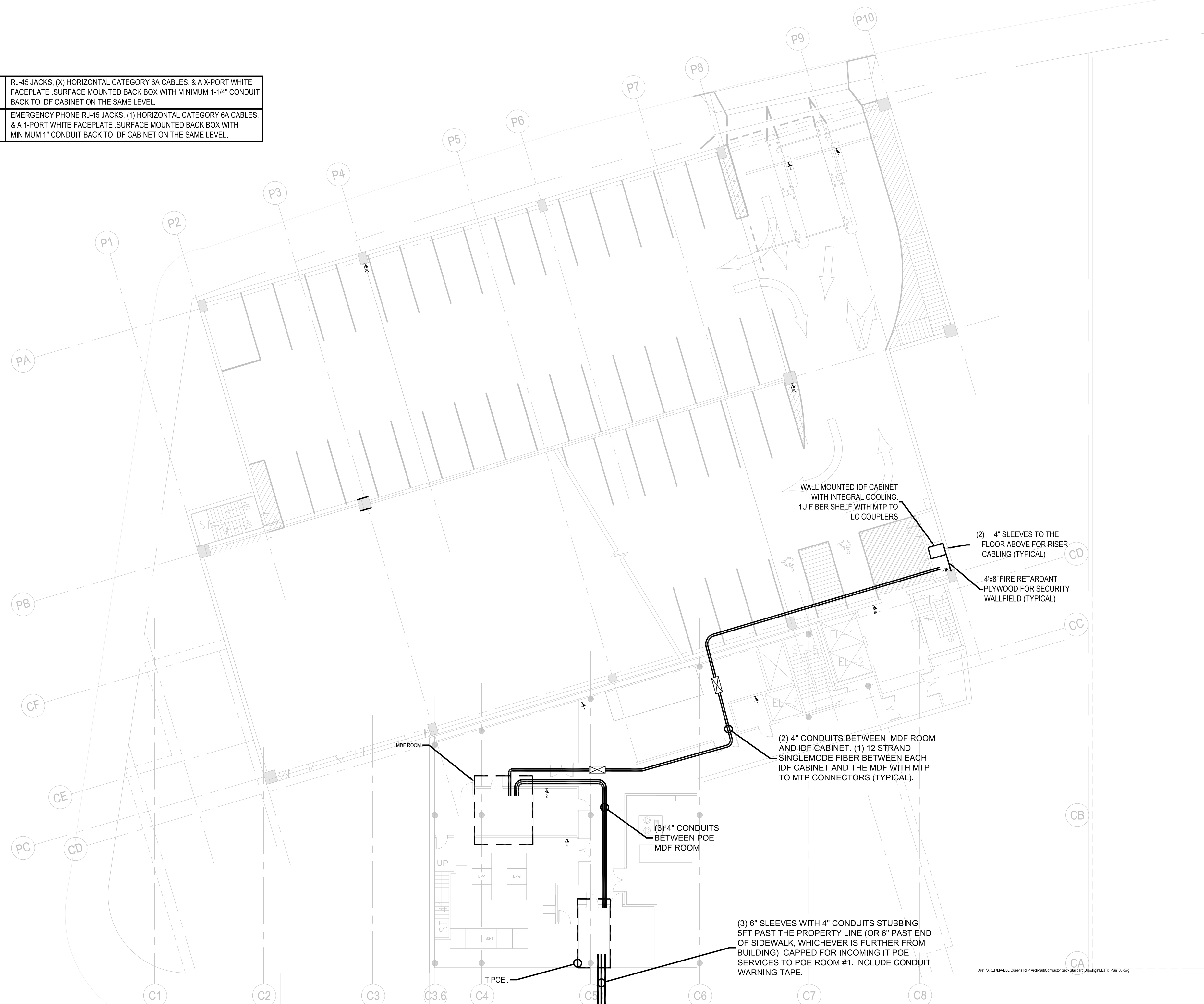
DRAWING TITLE:  
**TECHNOLOGY CELLAR PLAN**

SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**IT-100**  
DRAWING ORDER:

X Y	RJ-45 JACKS, (X) HORIZONTAL CATEGORY 6A CABLES, & A X-PORT WHITE FACEPLATE. SURFACE MOUNTED BACK BOX WITH MINIMUM 1-1/4" CONDUIT BACK TO IDF CABINET ON THE SAME LEVEL.
BL Y	EMERGENCY PHONE RJ-45 JACKS, (1) HORIZONTAL CATEGORY 6A CABLES, & A 1-PORT WHITE FACEPLATE. SURFACE MOUNTED BACK BOX WITH MINIMUM 1" CONDUIT BACK TO IDF CABINET ON THE SAME LEVEL.



**01** CELLAR FLOOR PLAN  
1/16" = 1'-0"

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212.792.8700


REVISION	DESCRIPTION	DATE

PROJECT: **NYC BBJ  
QUEENS GARAGE &  
COMMUNITY SPACE**

80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL  
DRAWINGS**

KEY PLAN:

PROJECT NORTH 

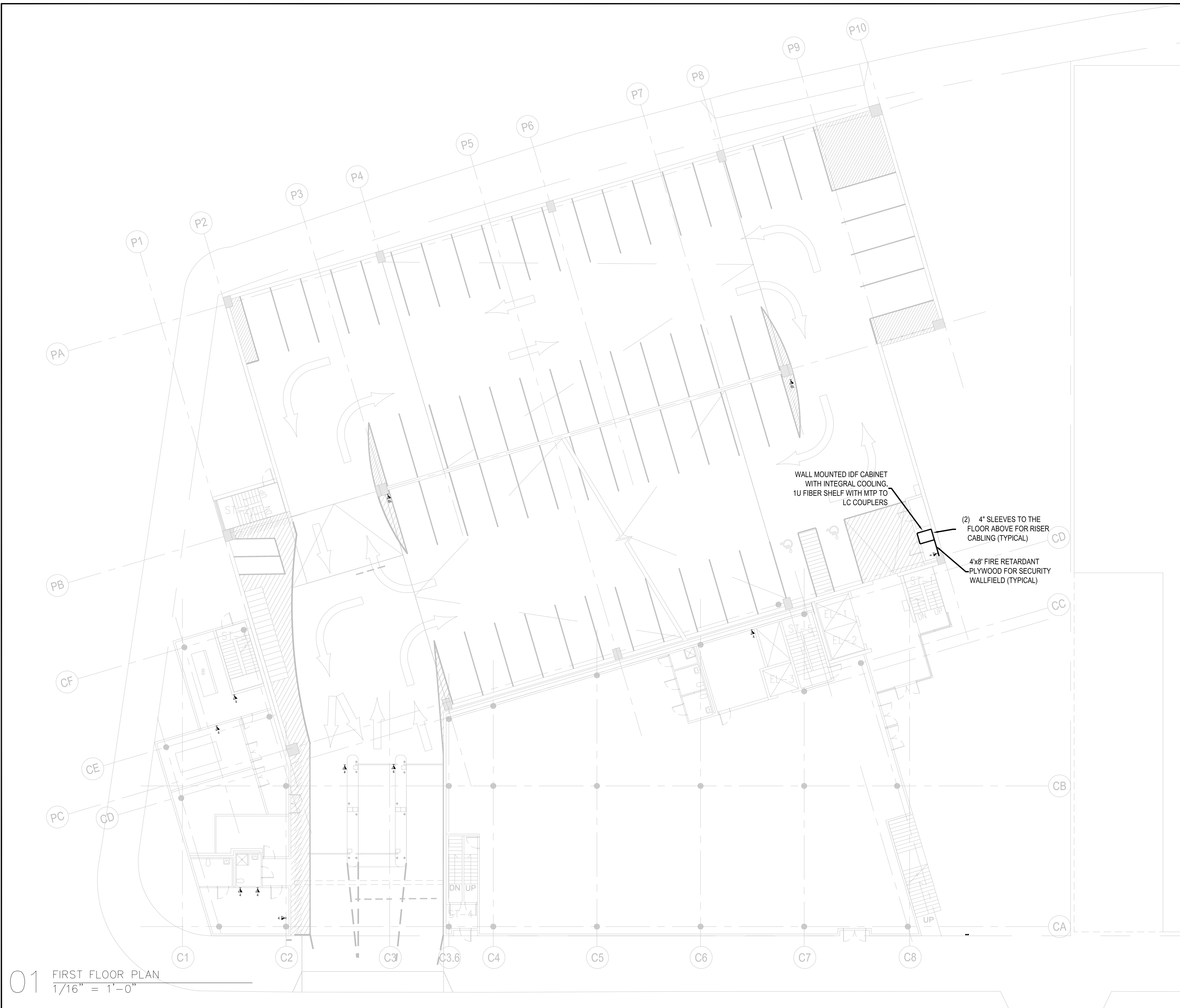
DRAWING TITLE:  
**TECHNOLOGY  
FIRST FLOOR  
PLAN**

SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**IT-101**

DRAWING ORDER: 176 of 205



**01** FIRST FLOOR PLAN  
1/16" = 1'-0"

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REVISION	DESCRIPTION	DATE

PROJECT: **NYC BBJ  
QUEENS GARAGE &  
COMMUNITY SPACE**

80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL  
DRAWINGS**

KEY PLAN:

PROJECT NORTH 

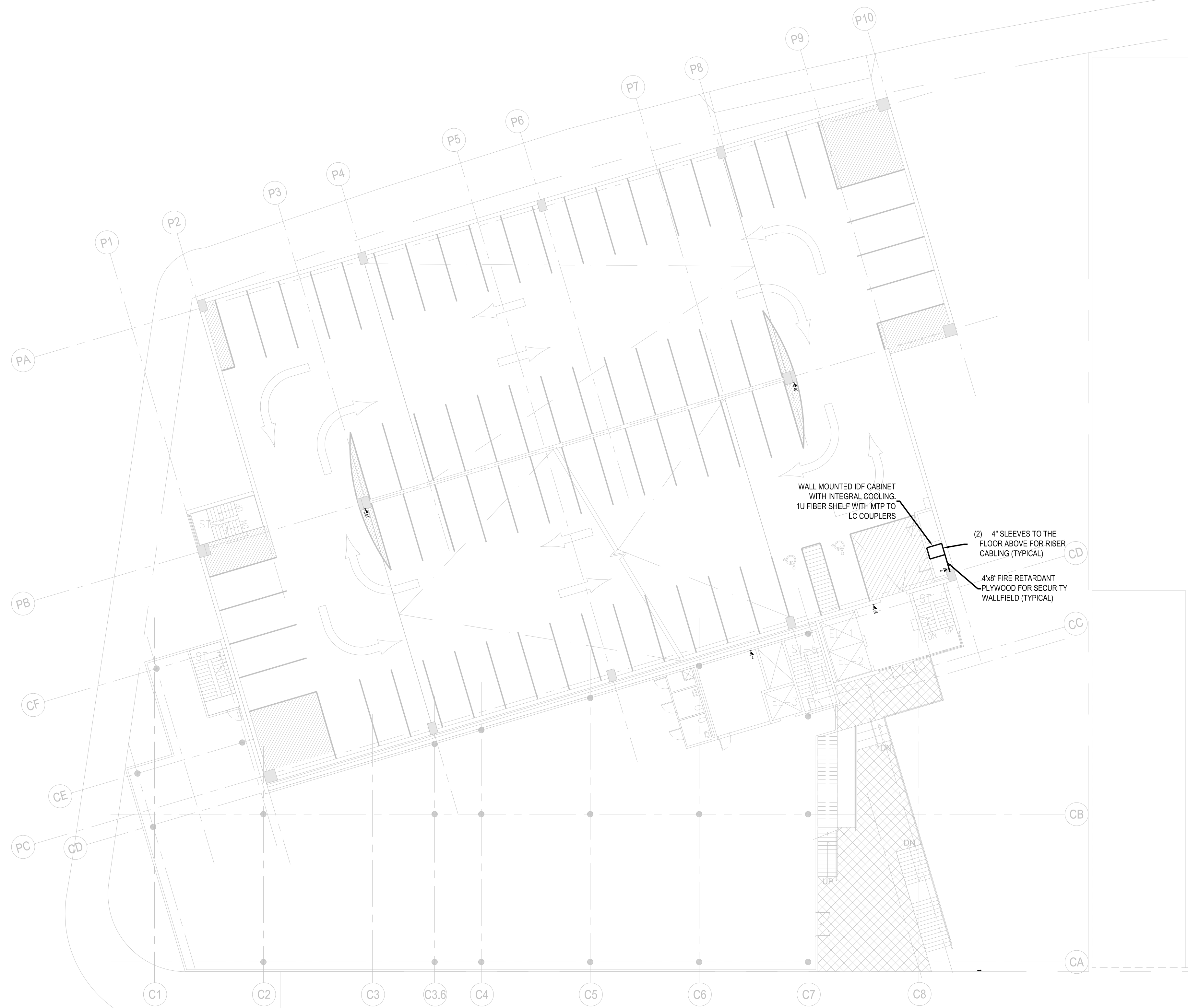
DRAWING TITLE:  
**TECHNOLOGY  
SECOND  
FLOOR PLAN**

SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**IT-102**

DRAWING ORDER: 177 of 205



**01** SECOND FLOOR PLAN  
1/16" = 1'-0"

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REVISION	DESCRIPTION	DATE

PROJECT: **NYC BBJ  
QUEENS GARAGE &  
COMMUNITY SPACE**

80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL  
DRAWINGS**

KEY PLAN:

PROJECT NORTH 

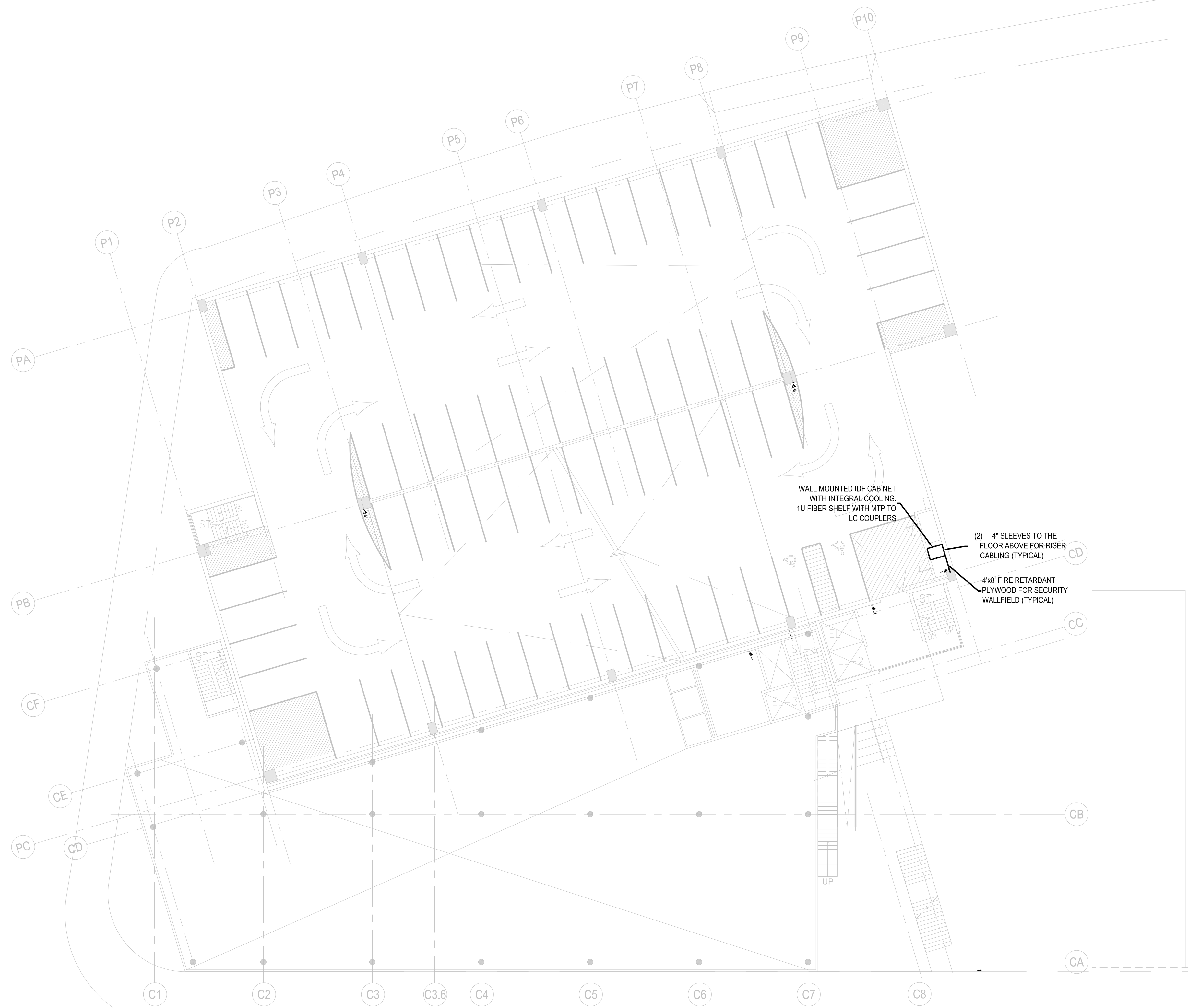
DRAWING TITLE:  
**TECHNOLOGY  
THIRD FLOOR  
PLAN**

SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**IT-103**

DRAWING ORDER: 178 of 205



**01** THIRD FLOOR PLAN  
1/16" = 1'-0"



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REVISION	DESCRIPTION	DATE

PROJECT: **NYC BBJ  
QUEENS GARAGE &  
COMMUNITY SPACE**

80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL  
DRAWINGS**

KEY PLAN:

PROJECT NORTH 

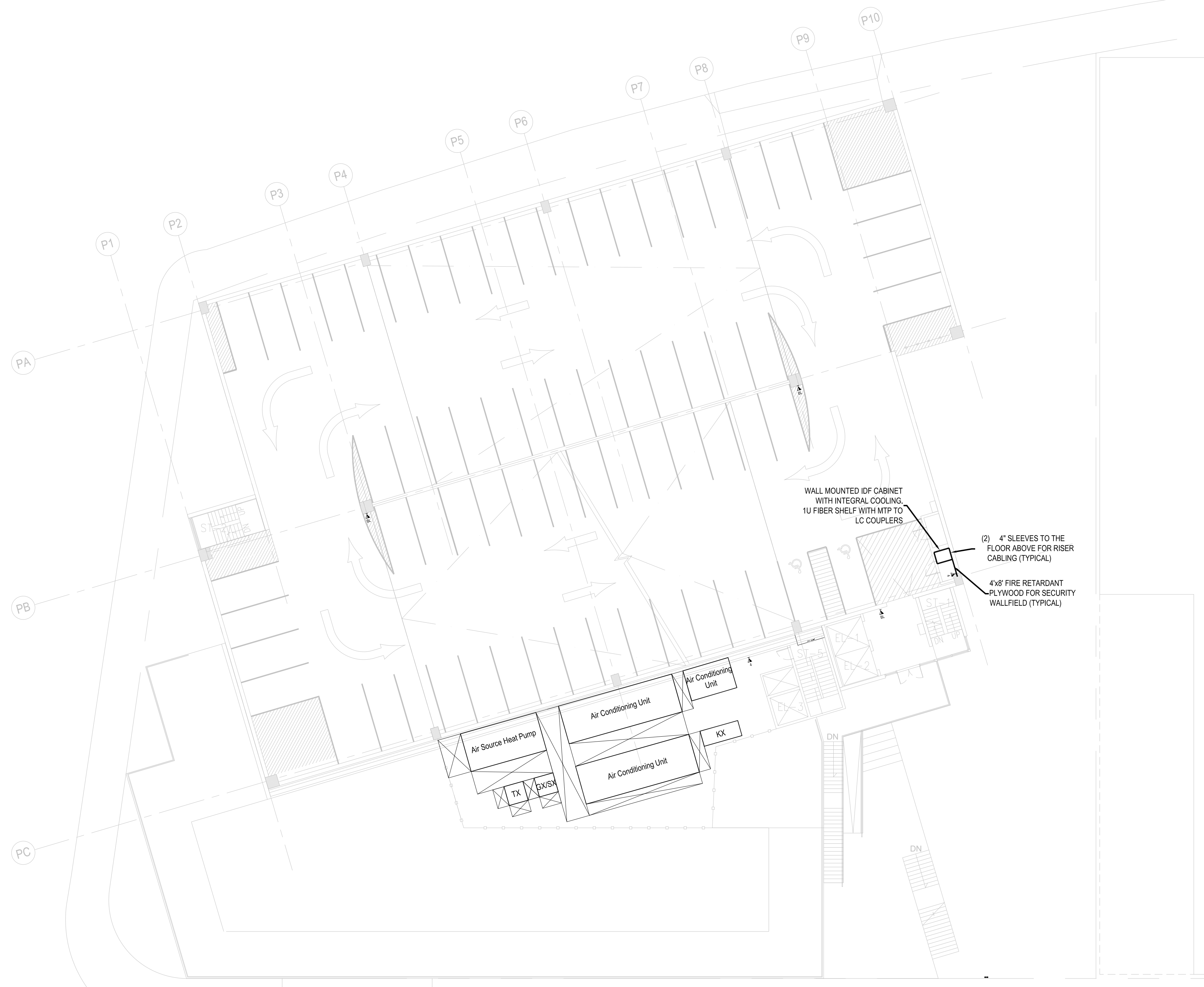
DRAWING TITLE:  
**TECHNOLOGY  
FOURTH  
FLOOR PLAN**

SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**IT-104**

DRAWING ORDER: 179 of 205



**01** FOURTH FLOOR PLAN  
1/16" = 1'-0"

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134 West 37th Street New York, NY 10018  
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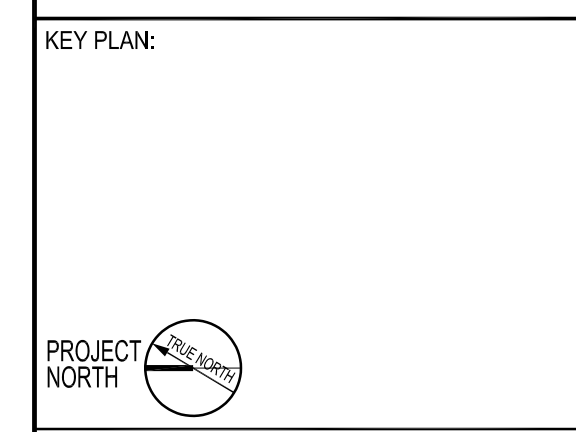
REVISION	DESCRIPTION	DATE


PROJECT: **NYC BBJ  
QUEENS GARAGE &  
COMMUNITY SPACE**

80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL  
DRAWINGS**

KEY PLAN:



PROJECT NORTH 

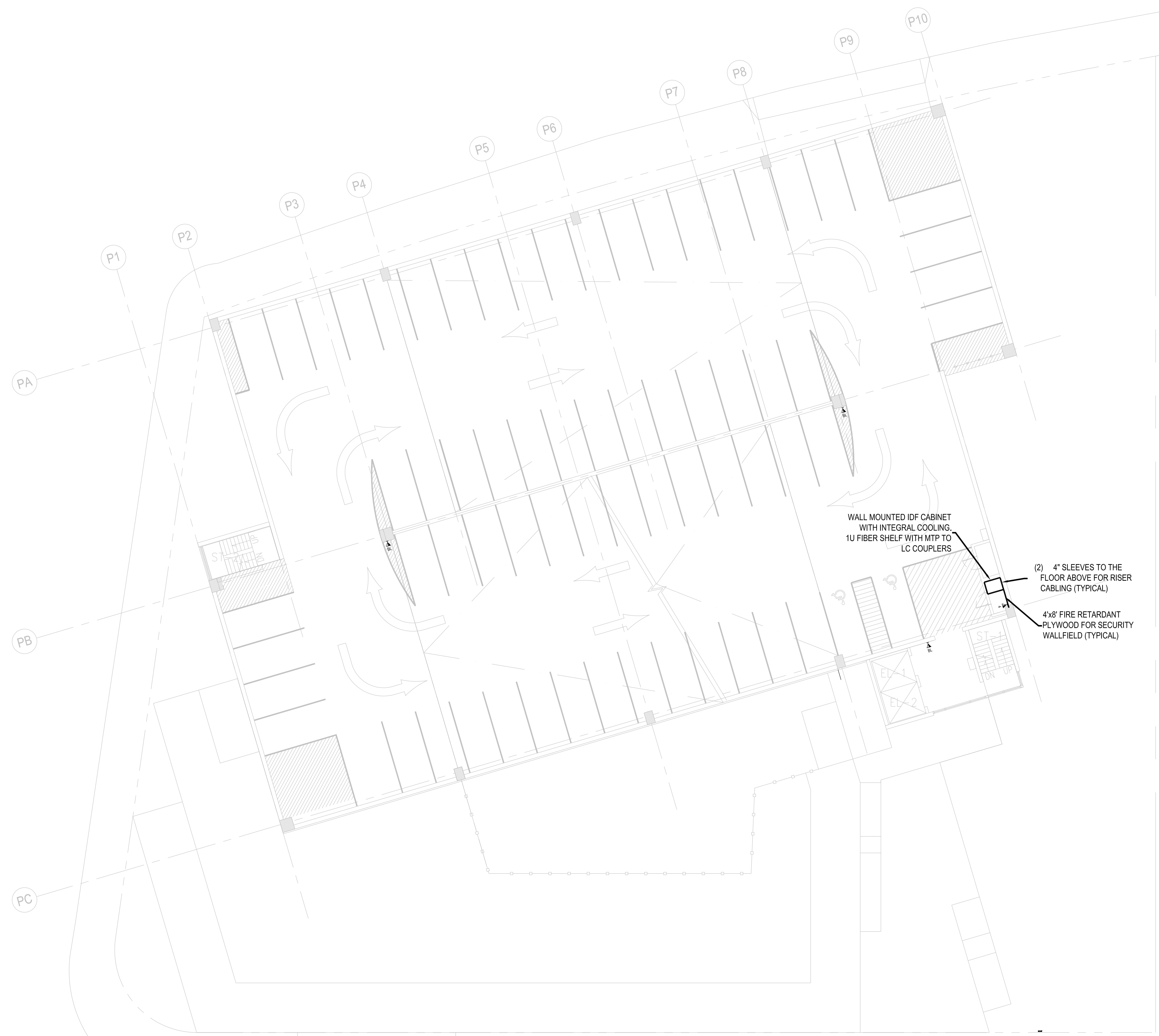
DRAWING TITLE:  
**TECHNOLOGY  
FIFTH FLOOR  
PLAN**

SCALE: 1/16" = 1'-0"      DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**IT-105**

DRAWING ORDER: 180 of 205



**01** FIFTH FLOOR PLAN  
1/16" = 1'-0"

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REVISION	DESCRIPTION	DATE

PROJECT: **NYC BBJ  
QUEENS GARAGE &  
COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL  
DRAWINGS**

KEY PLAN:

PROJECT NORTH 

DRAWING TITLE:  
**TECHNOLOGY  
SIXTH FLOOR  
PLAN**

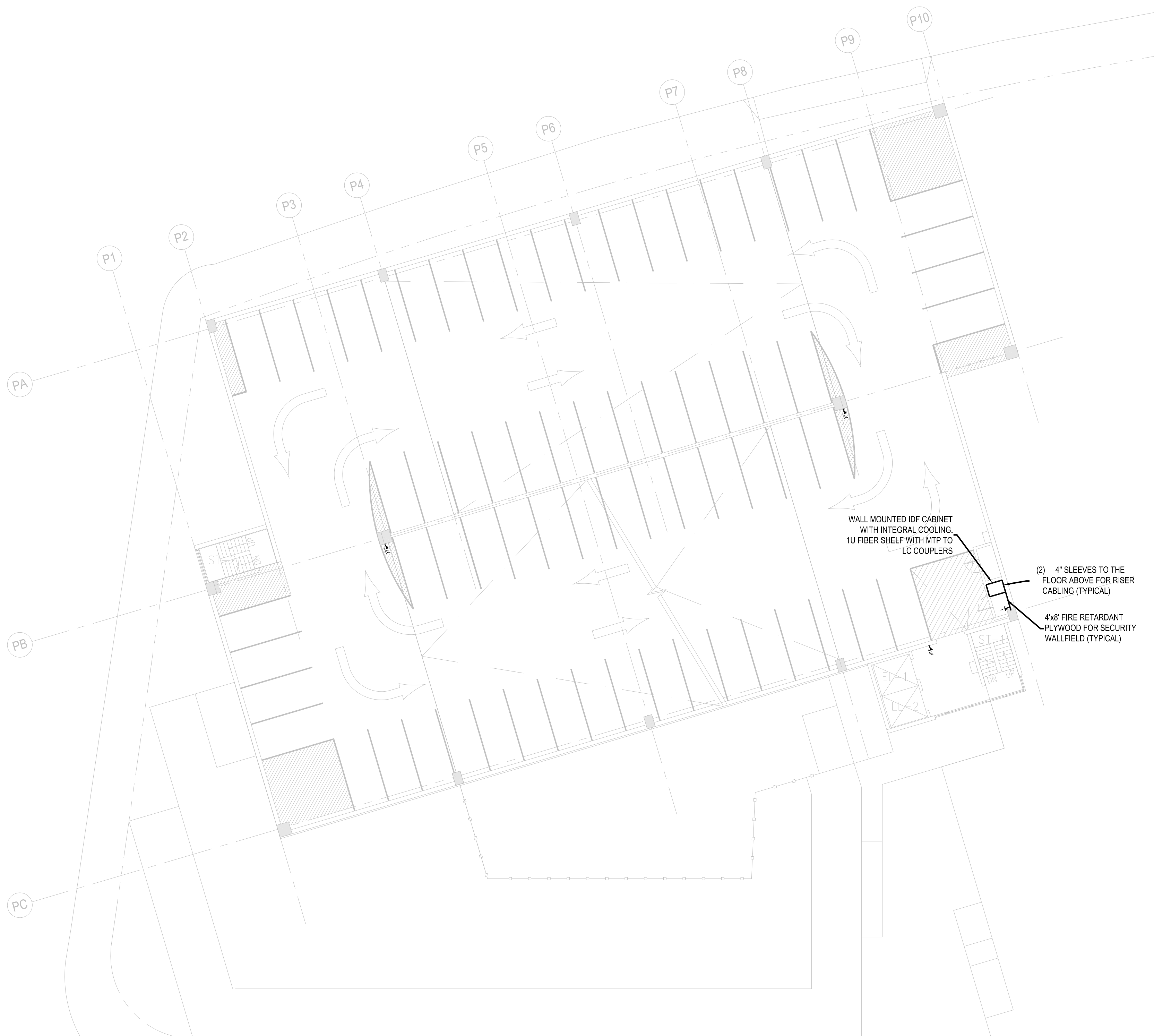
SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:

**IT-106**

DRAWING ORDER:



**01** SIXTH FLOOR PLAN  
1/16" = 1'-0"

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REVISION	DESCRIPTION	DATE

PROJECT: **NYC BBJ  
QUEENS GARAGE &  
COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL  
DRAWINGS**

KEY PLAN:

PROJECT NORTH



DRAWING TITLE:

**TECHNOLOGY  
SEVENTH  
FLOOR PLAN**

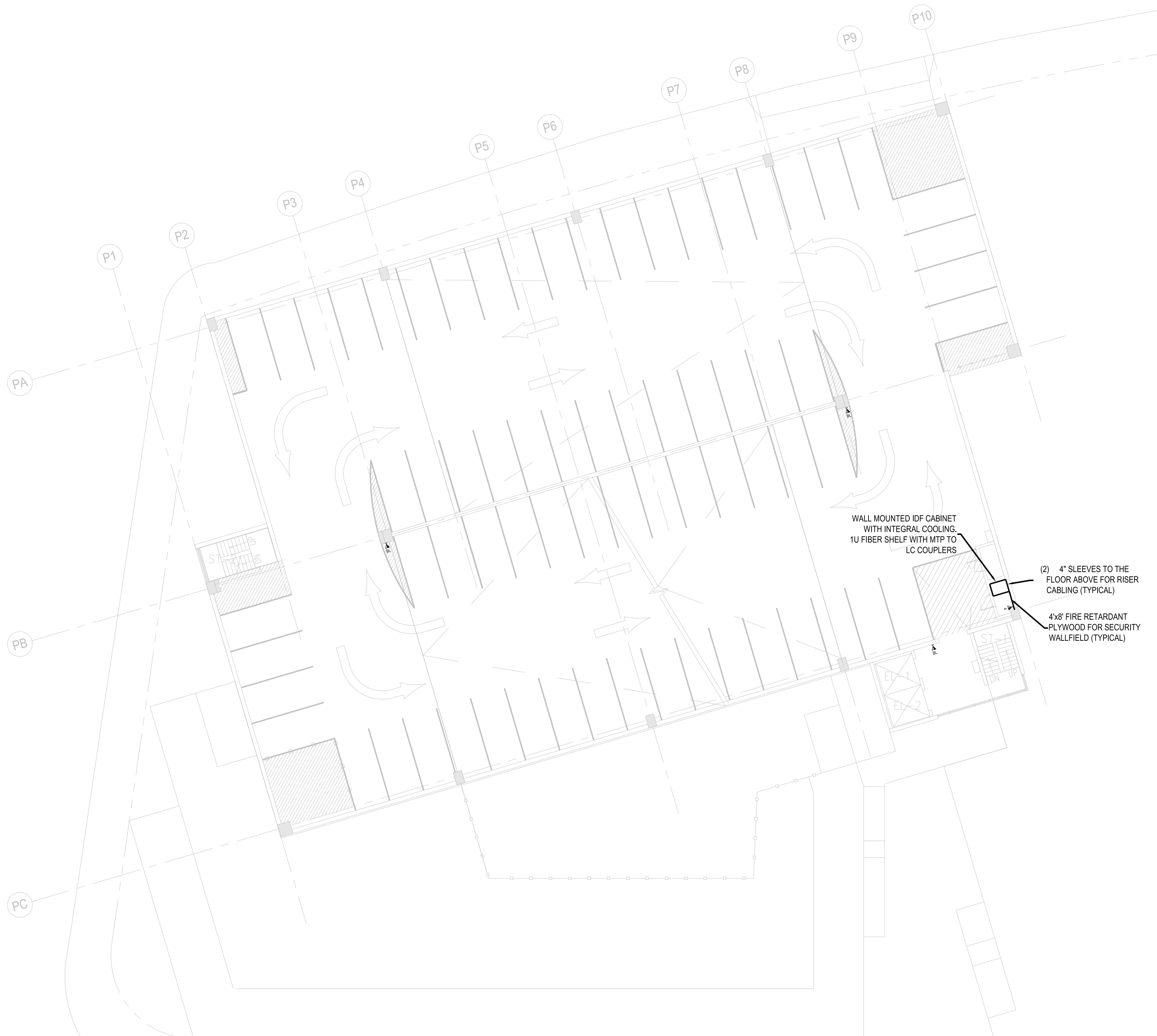
SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:

**IT-107**

DRAWING ORDER:



WALL MOUNTED IDF CABINET  
WITH INTEGRAL COOLING.  
1U FIBER SHELF WITH MTP TO  
LC COUPLERS

(2) 4" SLEEVES TO THE  
FLOOR ABOVE FOR RISER  
CABLING (TYPICAL)

4'x8' FIRE RETARDANT  
PLYWOOD FOR SECURITY  
WALLFIELD (TYPICAL)

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REVISION	DESCRIPTION	DATE

PROJECT: **NYC BBJ  
QUEENS GARAGE &  
COMMUNITY SPACE**

80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL  
DRAWINGS**

KEY PLAN:

PROJECT NORTH

DRAWING TITLE:  
**TECHNOLOGY  
EIGHTH FLOOR  
PLAN**

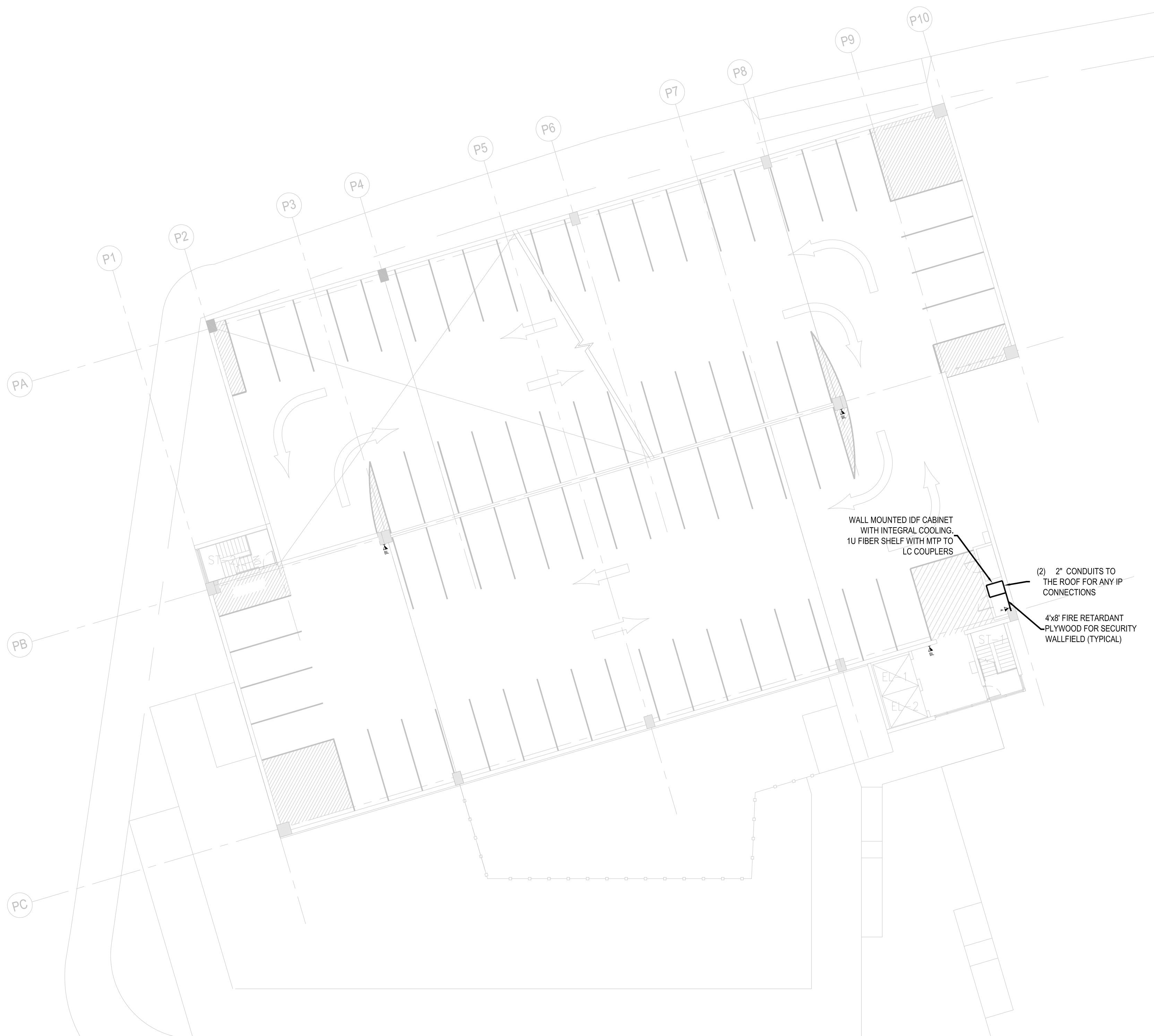
SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:

**IT-108**

DRAWING ORDER:



01 EIGHTH FLOOR PLAN  
1/16" = 1'-0"

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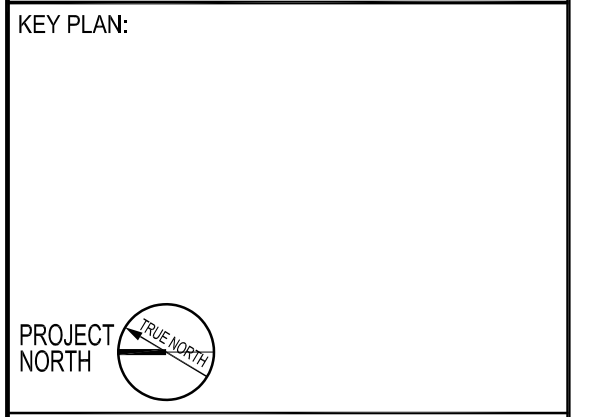
JFK&M ENGINEERS, LLP  
134 West 37th Street, New York, NY 10018  
212.792.8700

REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:



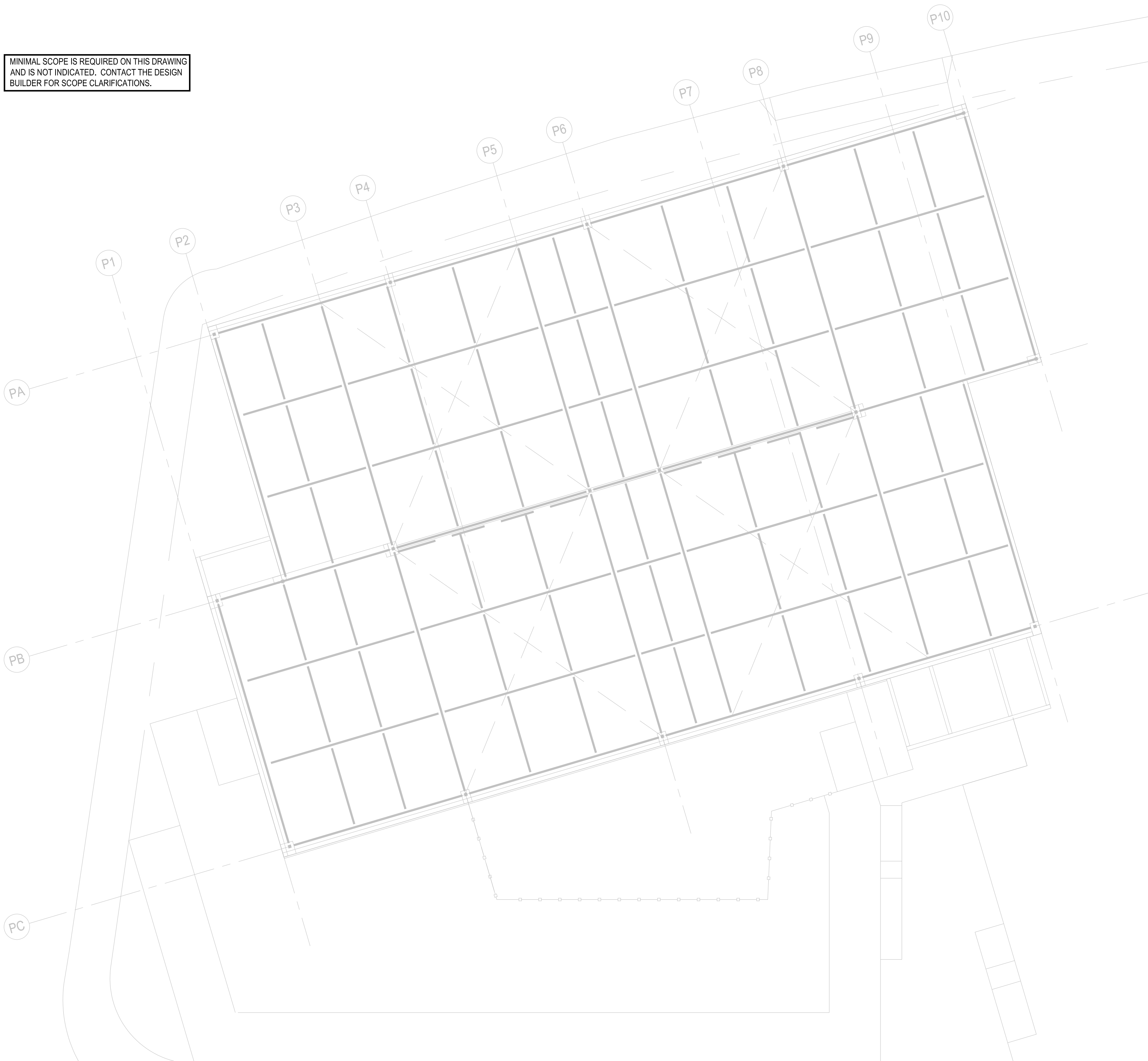

DRAWING TITLE:  
**TECHNOLOGY ROOF PLAN**

SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**IT-109**  
DRAWING ORDER: 184 of 205

MINIMAL SCOPE IS REQUIRED ON THIS DRAWING AND IS NOT INDICATED. CONTACT THE DESIGN BUILDER FOR SCOPE CLARIFICATIONS.



REVISION	DESCRIPTION	DATE

PROJECT: **NYC BBJ  
QUEENS GARAGE &  
COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL  
DRAWINGS**

KEY PLAN:



DRAWING TITLE:

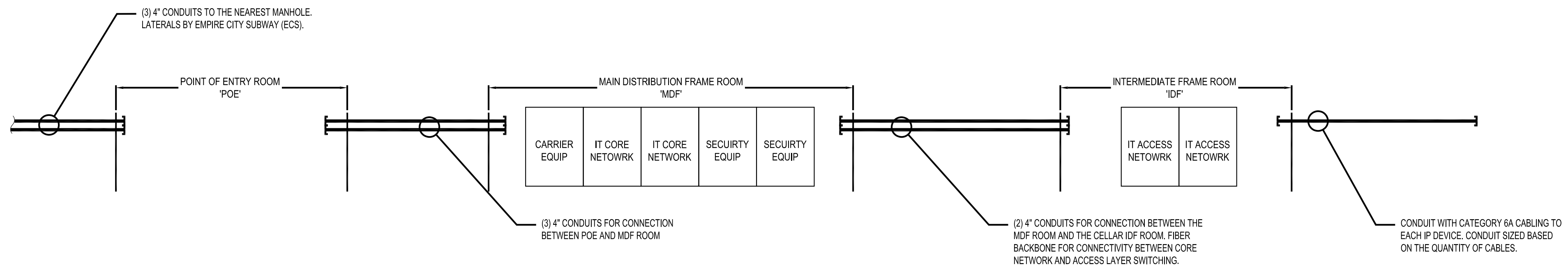
**TECHNOLOGY  
ONE LINE  
DIAGRAM**

SCALE: NTS DATE: SEPTEMBER 18, 2020

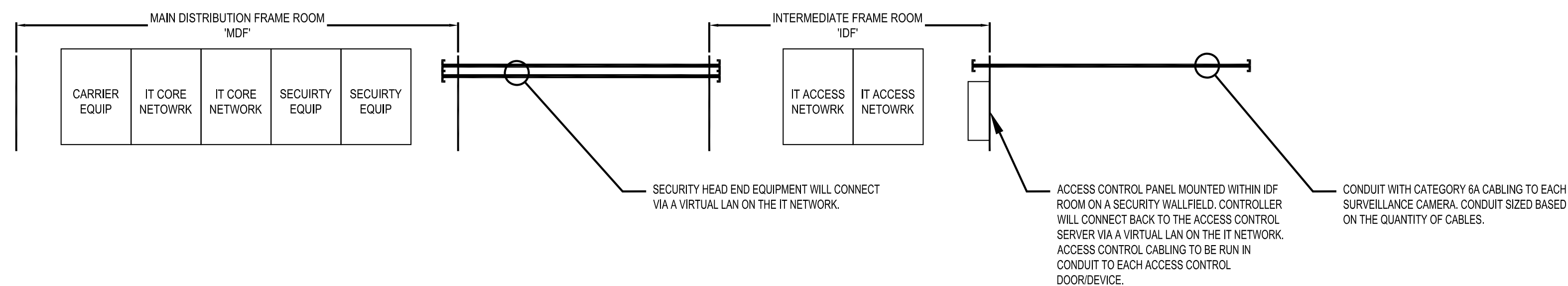
SEAL:

DRAWING NUMBER:

**IT-400**  
DRAWING ORDER:



INFORMATION TECHNOLOGY ONE LINE DIAGRAM



SECURITY ONE LINE DIAGRAM

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REVISION	DESCRIPTION	DATE

PROJECT: **NYC BBJ  
QUEENS GARAGE &  
COMMUNITY SPACE**  
  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL  
DRAWINGS**

KEY PLAN:

PROJECT NORTH

DRAWING TITLE:  
**SECURITY  
COVER SHEET**

SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**SEC-001**

DRAWING ORDER: 186 of 205

**SYMBOL LIST**

SYMBOL	DESCRIPTION
	DOOR CONTACT, FURNISH AND INSTALL DOOR CONTACT AND REQUIRED SECURITY CABLING BASED ON MANUFACTURERS REQUIREMENTS. ROUTE ALL CABLING TO DESIGNATED IDF ROOM.
	ELECTRIC MORTISE LOCKSET. FURNISH AND INSTALL ELECTRIC MORTISE LOCKSET AND REQUIRED SECURITY CABLING BASED ON MANUFACTURERS REQUIREMENTS. ROUTE ALL CABLING TO DESIGNATED IDF ROOM.
	ELECTRIC HINGE. FURNISH AND INSTALL ELECTRIC HINGE AND REQUIRED SECURITY CABLING
	CARD READER, WITH BLUETOOTH CAPABILITY FURNISH AND INSTALL CARD READER LOCK AND REQUIRED SECURITY CABLING BASED ON MANUFACTURERS REQUIREMENTS. ROUTE ALL CABLING TO DESIGNATED IDF ROOM
	LONG RANGE CARD READER LOCATION WITH BLUETOOTH CAPABILITY. COORDINATE REQUIREMENTS WITH PARKING GATE MANUFACTURER PRIOR TO INSTALLATION.
	DURESS ALARM, FURNISH AND INSTALL DURESS ALARM AND REQUIRED SECURITY CABLING BASED ON MANUFACTURERS REQUIREMENTS. ROUTE ALL CABLING TO DESIGNATED IDF ROOM.
	VISITOR MANAGEMENT WORKSTATION, INTEGRATOR TO PROVIDE VISITOR MANAGEMENT SOFTWARE TO SECURITY DESK WORKSTATION. WORK STATION SHALL INCLUDE (1) PC, (1) 24" SCREEN, (1) WEB CAM, (1) KEYBOARD, (1) MOUSE, (1) QR READER, AND (1) VISITOR BADGE PRINTER.
	SECURITY CONTROL WORKSTATION, INTEGRATOR TO PROVIDE ACCESS CONTROL AND VIDEO SURVEILLANCE SOFTWARE TO SECURITY DESK WORKSTATION. WORK STATION SHALL INCLUDE (1) PC, (1) 24" SCREEN FOR ACCESS CONTROL, (1) 24" SCREEN FOR CCTV, (1) TURNSTILE CONTROLLER, (1) KEYBOARD AND (1) MOUSE.
	MASTER VIDEO INTERCOM STATION. CONTRACTOR TO FURNISH AND INSTALL (1) CAT. 6A CABLE FROM THE DESIGNATED IDF.
	REMOTE VIDEO INTERCOM STATION. CONTRACTOR TO FURNISH AND INSTALL (1) CAT. 6A CABLE FROM THE DESIGNATED IDF.
	DOOR RELEASE. FURNISH AND INSTALL DURESS RELEASE BUTTON AND REQUIRED SECURITY CABLING BASED ON MANUFACTURERS REQUIREMENTS. ROUTE ALL CABLING TO DESIGNATED IDF ROOM.
	FIXED IP CAMERA DOME. FURNISH AND INSTALL (1) CAT. 6A CABLE PER CAMERA LOCATION. FURNISH AND INSTALL A 1-PORT SURFACE MOUNT BOX WITH CAT. 6A FEMALE RJ45 JACK AT THE CAMERA SIDE. CABLING SHALL BE PROVIDED BY IT CONTRACTOR. IT CONTRACTOR SHALL PROVIDE (1) CAT 6A PATCH CABLE FOR PATCHING AT THE DEVICE END.
	ELEVATOR CAMERA. CONTRACTOR TO RUN (1) CAT. 6A CABLE FROM THE DESIGNATED IDF TO ELEVATOR MACHINE ROOM OUTLET FOR EACH DEVICE LOCATION. CONFIRM EXACT CABLING AND TERMINATION DETAILS WITH EQUIPMENT MANUFACTURER PRIOR TO INSTALLATION.
	FIXED EXTERIOR IP CAMERA DOME WITH WEATHER TIGHT ENCLOSURE. FURNISH AND INSTALL (1) CATEGORY 6A CABLE PER CAMERA LOCATION. FURNISH AND INSTALL A 2-PORT SURFACE MOUNT BOX WITH (1) CAT 6A JACK AT THE CAMERA SIDE. CABLING SHALL BE PROVIDED BY IT CONTRACTOR. IT CONTRACTOR SHALL PROVIDE (1) CAT 6A PATCH CABLE FOR PATCHING AT THE DEVICE END.
	LICENSE PLATE READER CAMER WEATHER TIGHT ENCLOSURE. FURNISH AND INSTALL (1) CATEGORY 6A CABLE PER CAMERA LOCATION. FURNISH AND INSTALL A 2-PORT SURFACE MOUNT BOX WITH (1) CAT 6A JACK AT THE CAMERA SIDE. CABLING SHALL BE PROVIDED BY IT CONTRACTOR. IT CONTRACTOR SHALL PROVIDE (1) CAT 6A PATCH CABLE FOR PATCHING AT THE DEVICE END.

**CABLING SCHEDULE**

SYMBOL	CABLE TYPE
	18 AWG, 2-CONDUCTOR (SHIELDED)
	18 AWG, 6-CONDUCTOR (SHIELDED)
	18 AWG, 4-CONDUCTOR (SHIELDED)
	18 AWG, 6-CONDUCTOR (SHIELDED)
	18 AWG, 4-CONDUCTOR (SHIELDED)
	22 AWG, 4-CONDUCTOR (SHIELDED)



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REVISION	DESCRIPTION	DATE

PROJECT: **NYC BBJ  
QUEENS GARAGE &  
COMMUNITY SPACE**

80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL  
DRAWINGS**

KEY PLAN:

PROJECT NORTH 

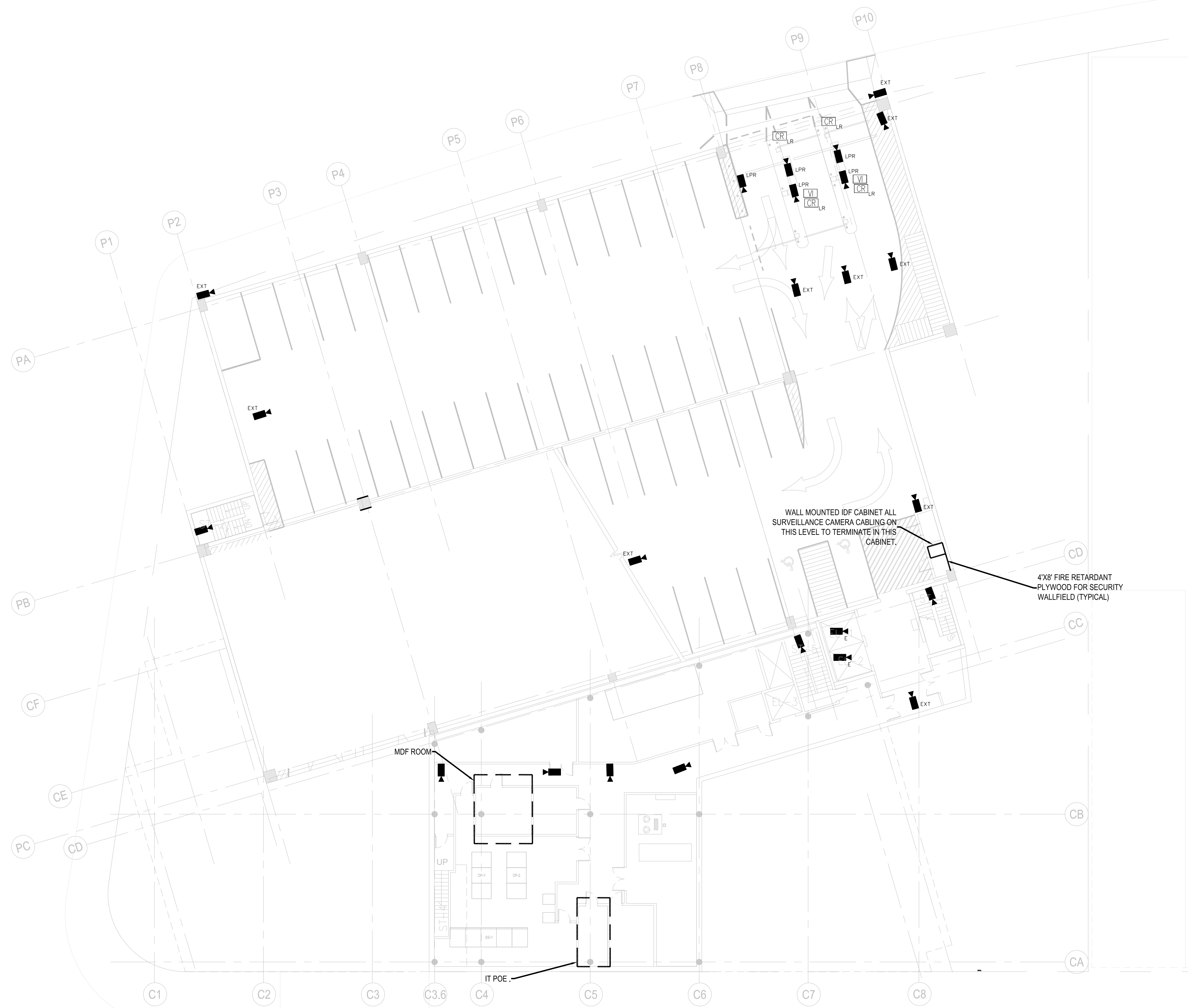
DRAWING TITLE:  
**SECURITY  
CELLAR PLAN**

SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**SEC-100**

DRAWING ORDER: 187 of 205



**01** CELLAR FLOOR PLAN  
1/16" = 1'-0"

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80 Pine Street New York, NY 10015  
212.530.9300


JFK&M ENGINEERS, LLP  
134 West 37th Street New York, NY 10018  
212.792.8700

REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:

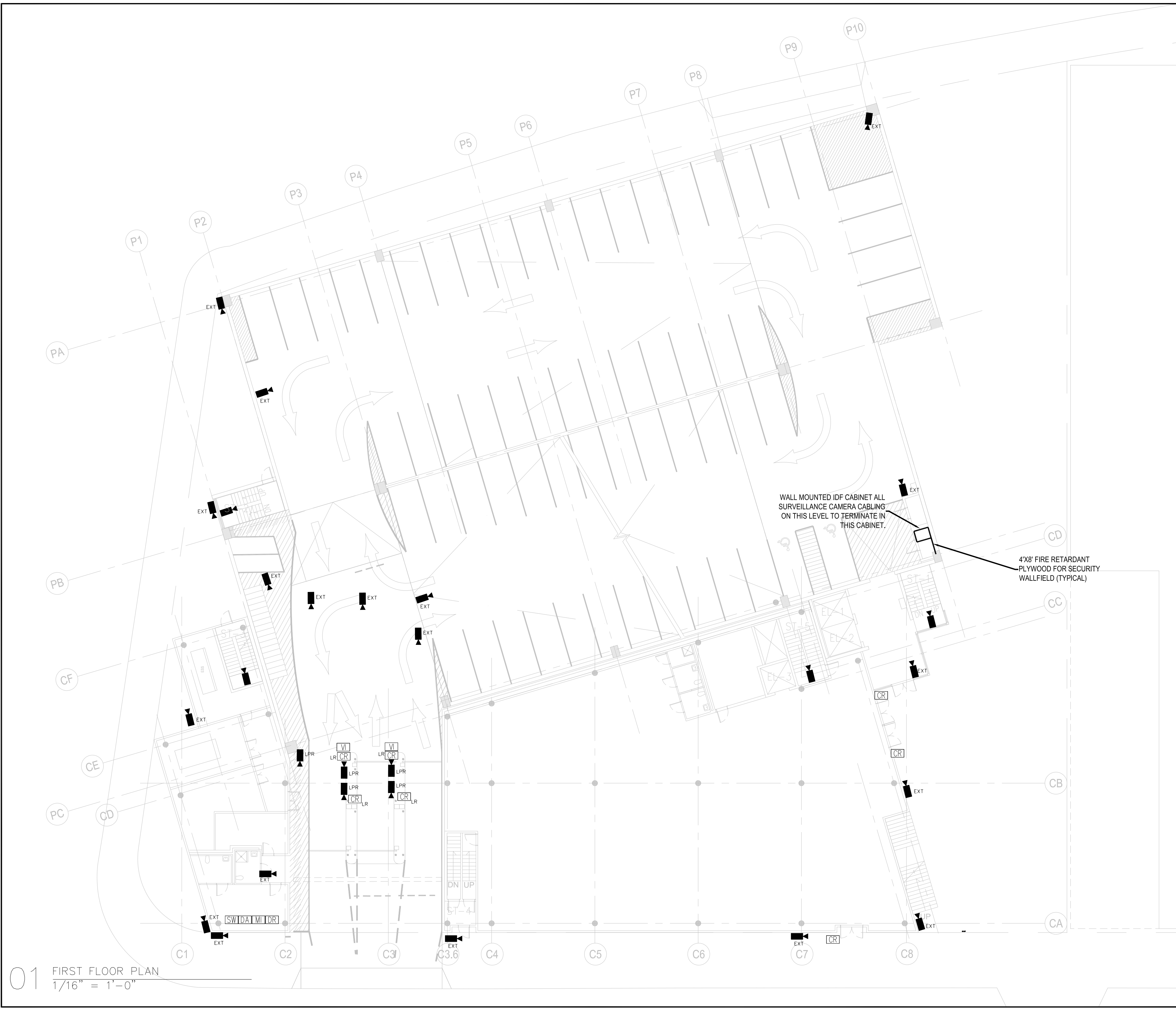
PROJECT NORTH 

DRAWING TITLE:  
**SECURITY FIRST FLOOR PLAN**

SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**SEC-101**  
DRAWING ORDER: 188 of 205



**01** FIRST FLOOR PLAN  
1/16" = 1'-0"

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134 West 37th Street New York, NY 10018  
212.792.8700

REVISION	DESCRIPTION	DATE

PROJECT: **NYC BBJ  
QUEENS GARAGE &  
COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL  
DRAWINGS**

KEY PLAN:

PROJECT NORTH

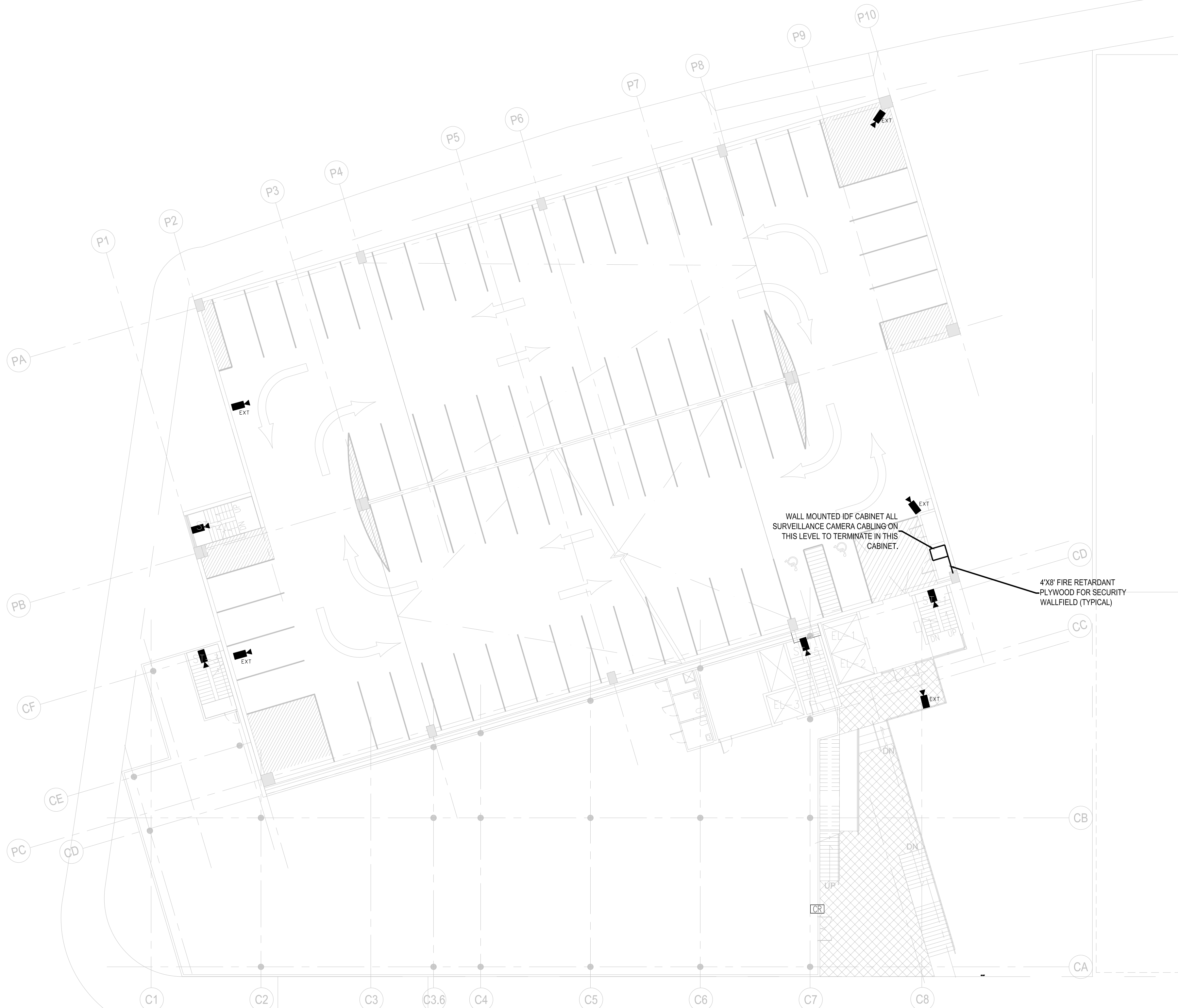
DRAWING TITLE:  
**SECURITY  
SECOND  
FLOOR PLAN**

SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**SEC-102**

DRAWING ORDER: 189 of 205



**01** SECOND FLOOR PLAN  
1/16" = 1'-0"

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212.792.8700

REVISION	DESCRIPTION	DATE

PROJECT: **NYC BBJ  
QUEENS GARAGE &  
COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL  
DRAWINGS**

KEY PLAN:

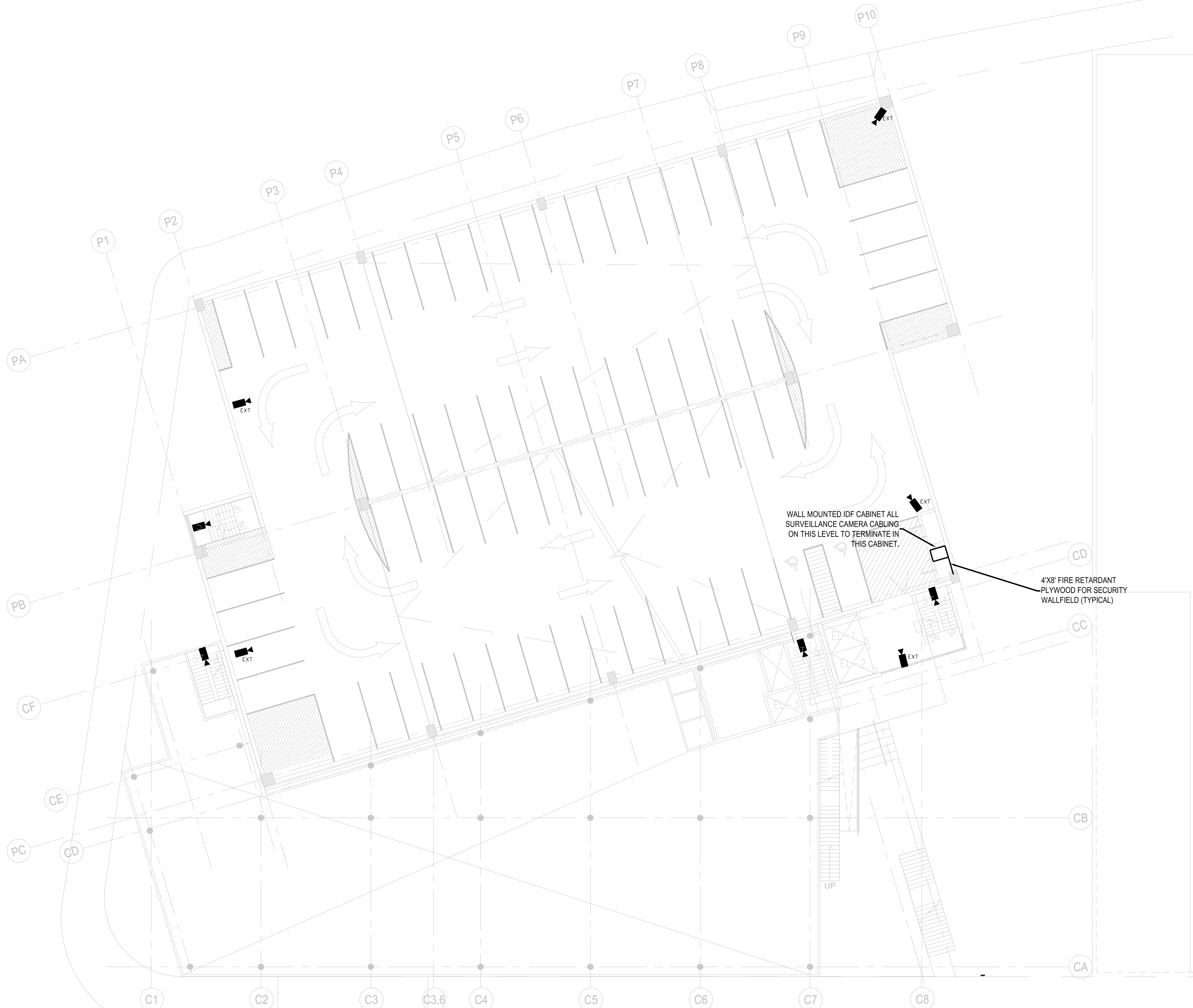
PROJECT NORTH 

DRAWING TITLE:  
**SECURITY  
THIRD FLOOR  
PLAN**

SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**SEC-103**  
DRAWING ORDER: 190 of 205



**01** THIRD FLOOR PLAN  
1/16" = 1'-0"

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134 West 37th Street New York, NY 10018  
212.792.8700

REVISION	DESCRIPTION	DATE

PROJECT: **NYC BBJ  
QUEENS GARAGE &  
COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL  
DRAWINGS**

KEY PLAN:

PROJECT NORTH



DRAWING TITLE:

**SECURITY  
FOURTH  
FLOOR PLAN**

SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:

**SEC-104**

DRAWING ORDER:



**01** FOURTH FLOOR PLAN  
1/16" = 1'-0"

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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:

PROJECT NORTH 

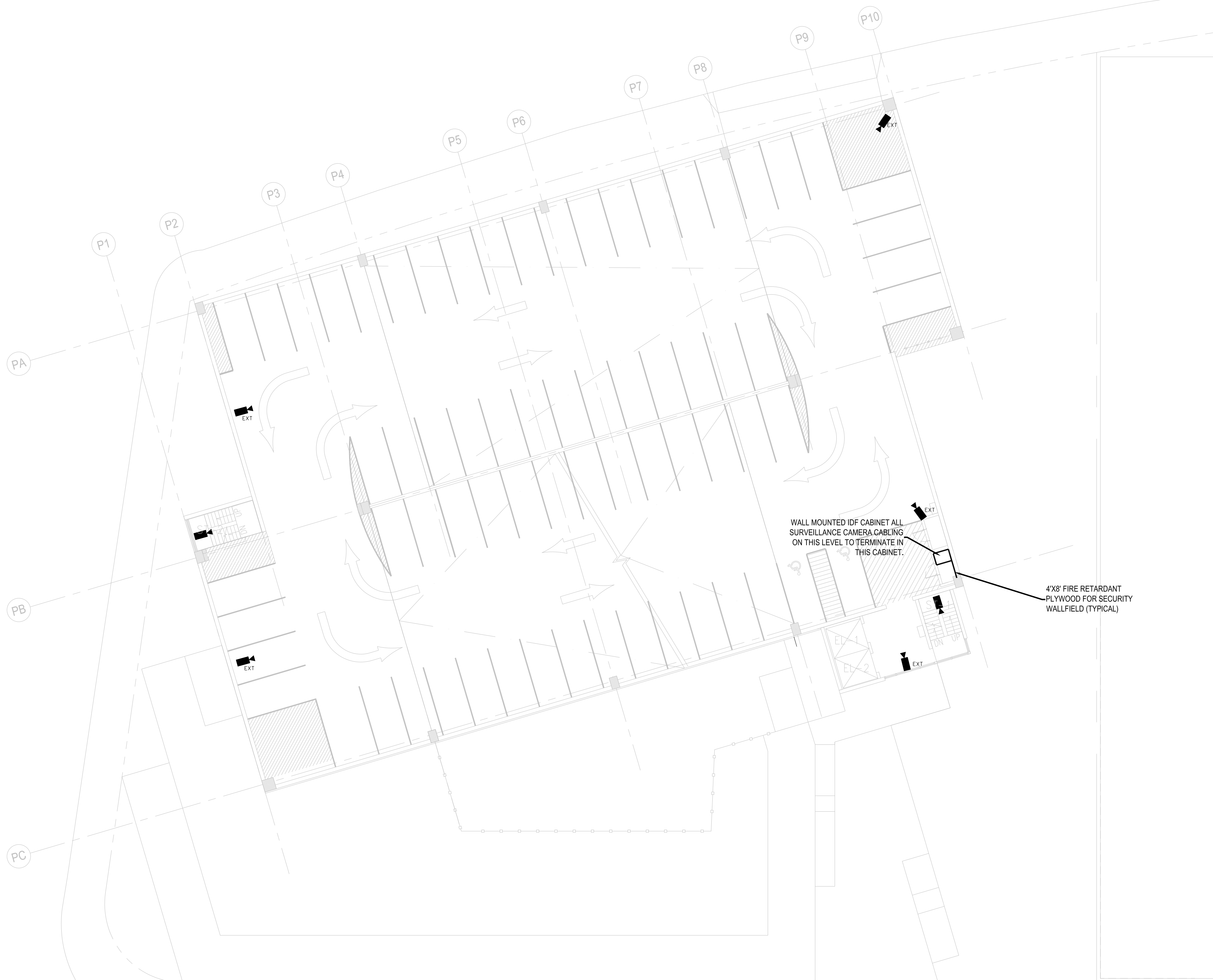
DRAWING TITLE:  
**SECURITY FIFTH FLOOR PLAN**

SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**SEC-105**

DRAWING ORDER: 192 of 205



01 FIFTH FLOOR PLAN  
1/16" = 1'-0"

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REVISION	DESCRIPTION	DATE

PROJECT: **NYC BBJ  
QUEENS GARAGE &  
COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL  
DRAWINGS**

KEY PLAN:

PROJECT NORTH



DRAWING TITLE:

**SECURITY  
SIXTH FLOOR  
PLAN**

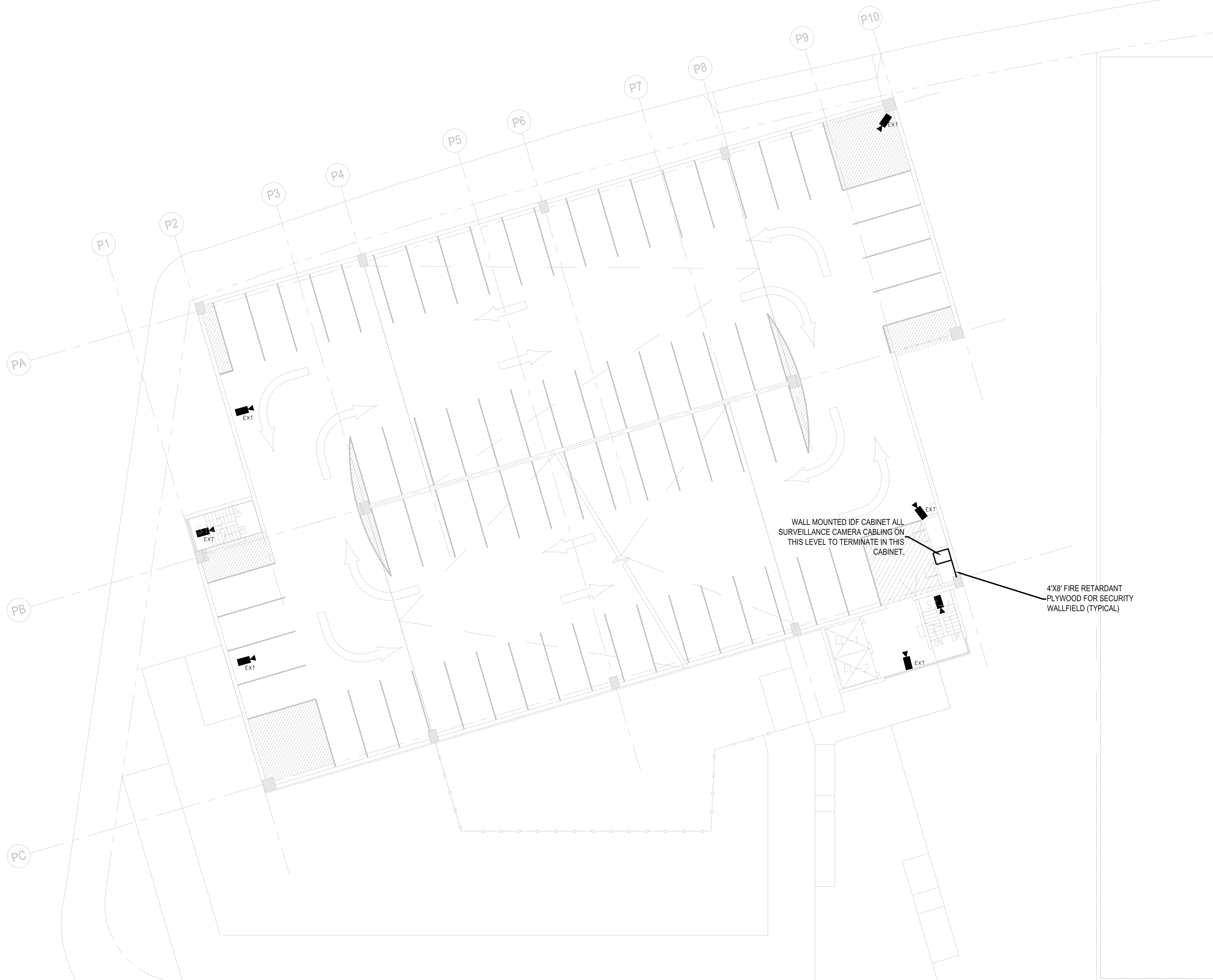
SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:

**SEC-106**

DRAWING ORDER:



**01** SIXTH FLOOR PLAN  
1/16" = 1'-0"

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REVISION	DESCRIPTION	DATE

PROJECT: **NYC BBJ  
QUEENS GARAGE &  
COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL  
DRAWINGS**

KEY PLAN:

PROJECT NORTH



DRAWING TITLE:

**SECURITY  
SEVENTH  
FLOOR PLAN**

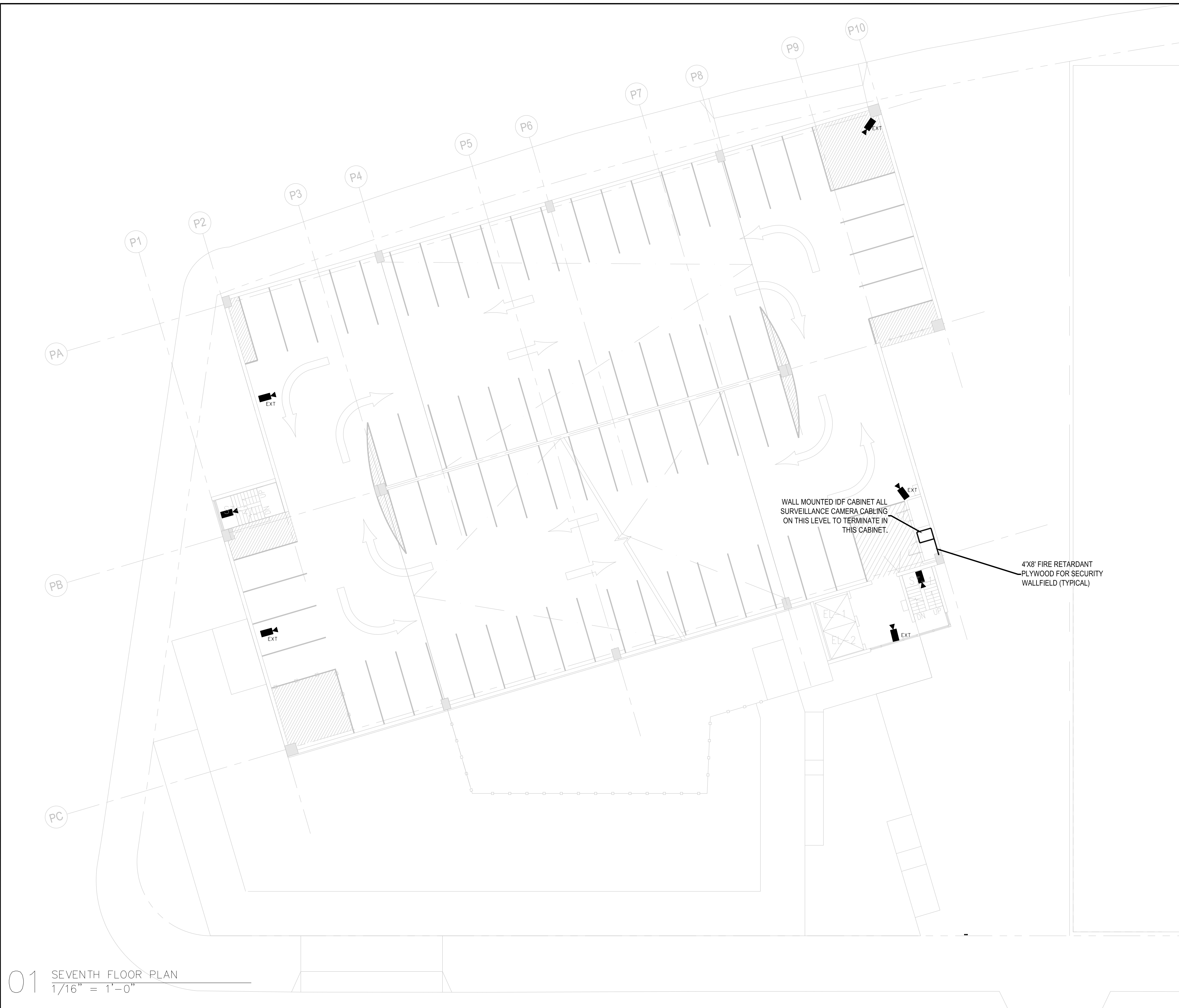
SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:

**SEC-107**

DRAWING ORDER:



**01** SEVENTH FLOOR PLAN  
1/16" = 1'-0"



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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:

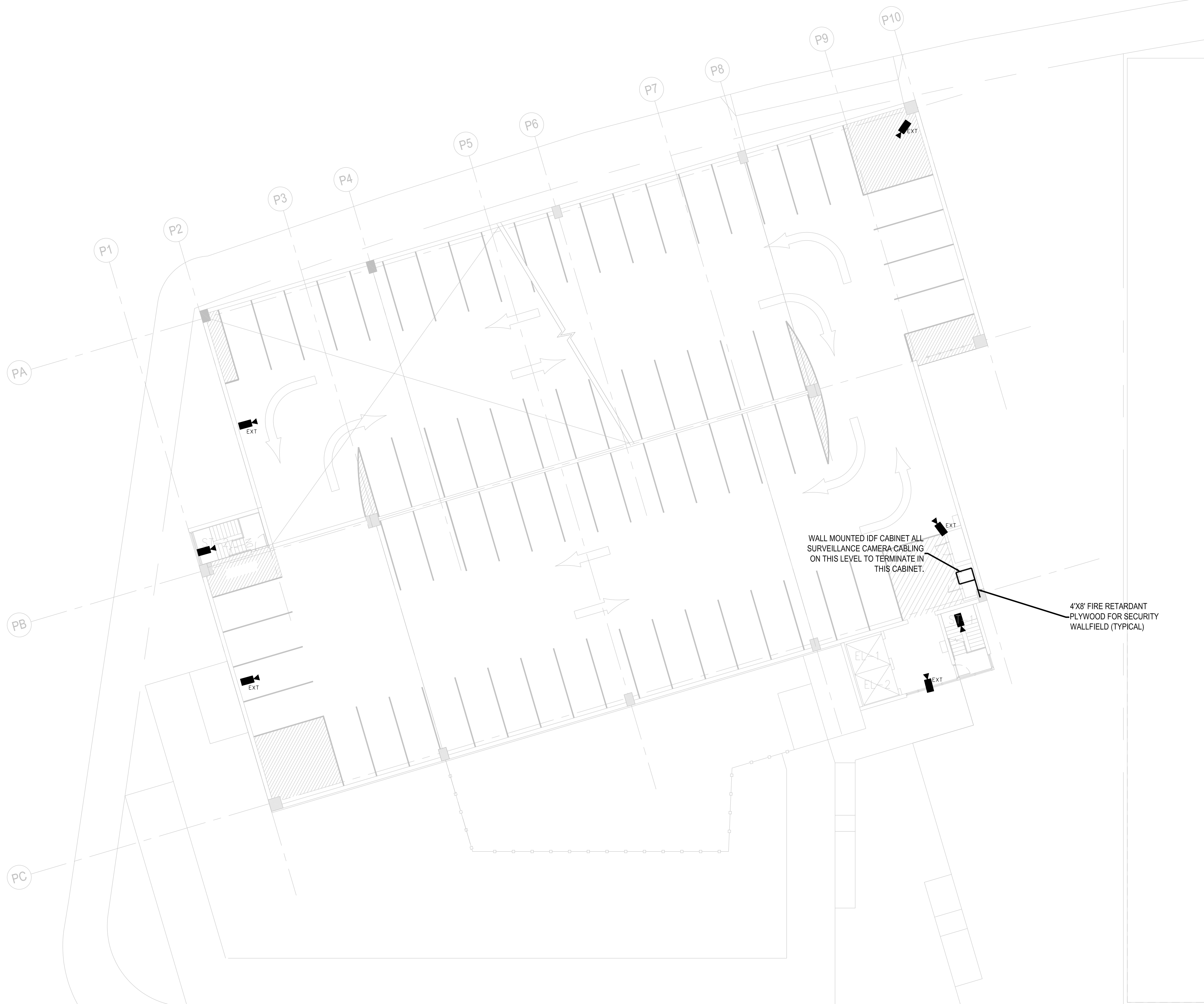
PROJECT NORTH 

DRAWING TITLE:  
**SECURITY EIGHTH FLOOR PLAN**

SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**SEC-108**  
DRAWING ORDER: 195 of 205



01 EIGHTH FLOOR PLAN  
1/16" = 1'-0"

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212.530.9300

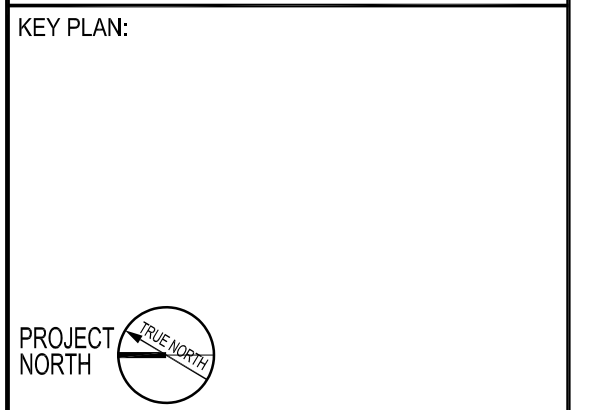
JFK&M ENGINEERS, LLP  
134 West 37th Street, New York, NY 10018  
212.792.8700


REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:



PROJECT NORTH 

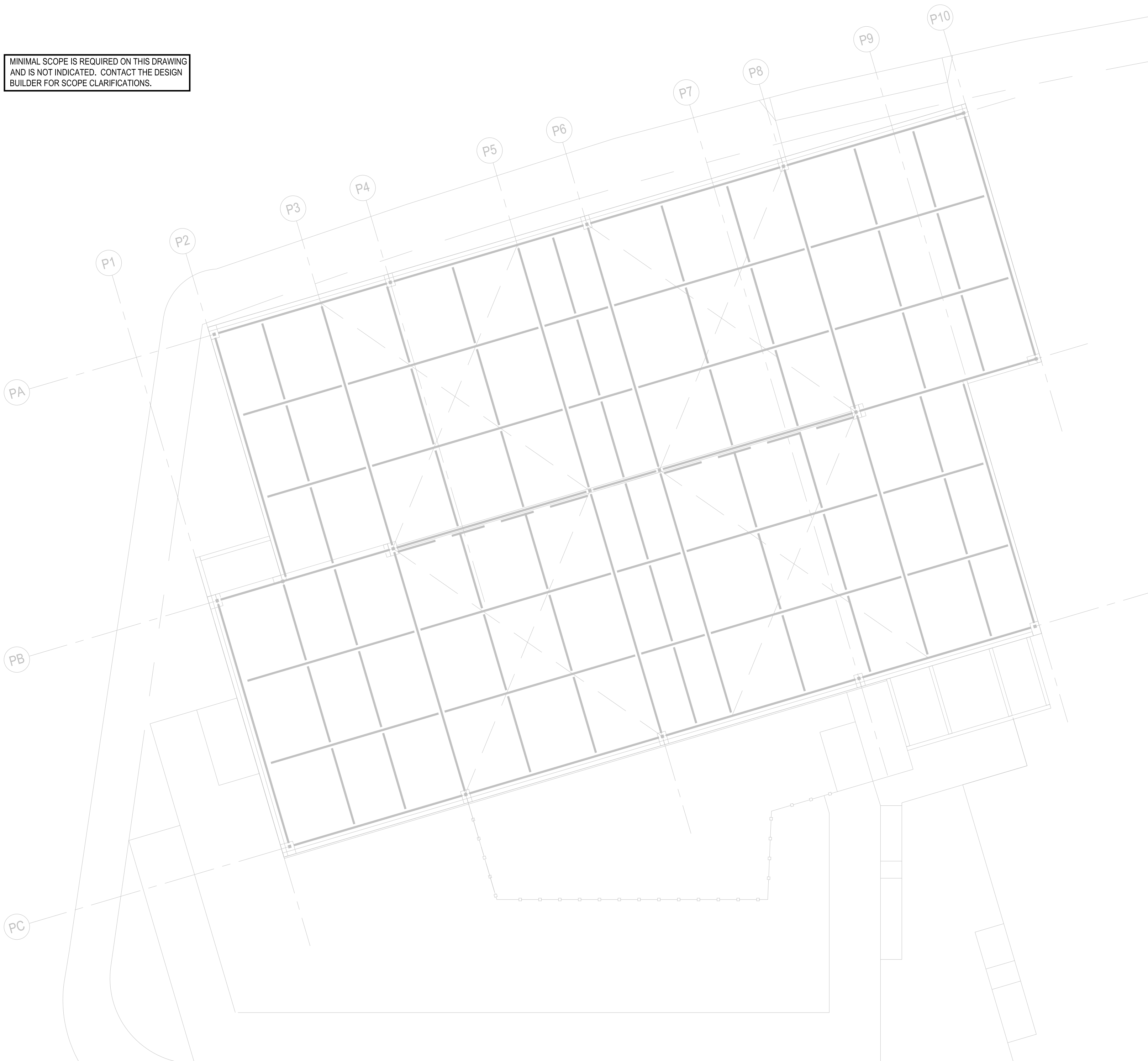
DRAWING TITLE:  
**SECURITY ROOF PLAN**

SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**SEC-109**  
DRAWING ORDER: 196 of 205

MINIMAL SCOPE IS REQUIRED ON THIS DRAWING AND IS NOT INDICATED. CONTACT THE DESIGN BUILDER FOR SCOPE CLARIFICATIONS.



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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:



DRAWING TITLE:  
**CELLAR SIGNAGE PLAN**

SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**WF-100**  
DRAWING ORDER: 197 of 205

**SIGNAGE LEGEND**

- ID IDENTIFICATION SIGNS
- WF DIRECTIONAL WAYFINDING
- IN INFORMATIONAL SIGNS
- DI DISPLAY



01 CELLAR FLOOR SIGNAGE PLAN  
1/16" = 1'-0"

REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:

PROJECT NORTH

DRAWING TITLE:

**FIRST FLOOR SIGNAGE PLAN**

SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:

**WF-101**

DRAWING ORDER:

**SIGNAGE LEGEND**

- ID IDENTIFICATION SIGNS
- WF DIRECTIONAL WAYFINDING
- IN INFORMATIONAL SIGNS
- DI DISPLAY



01 FIRST FLOOR SIGNAGE PLAN  
1/16" = 1'-0"

REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:



DRAWING TITLE:  
**SECOND FLOOR SIGNAGE PLAN**

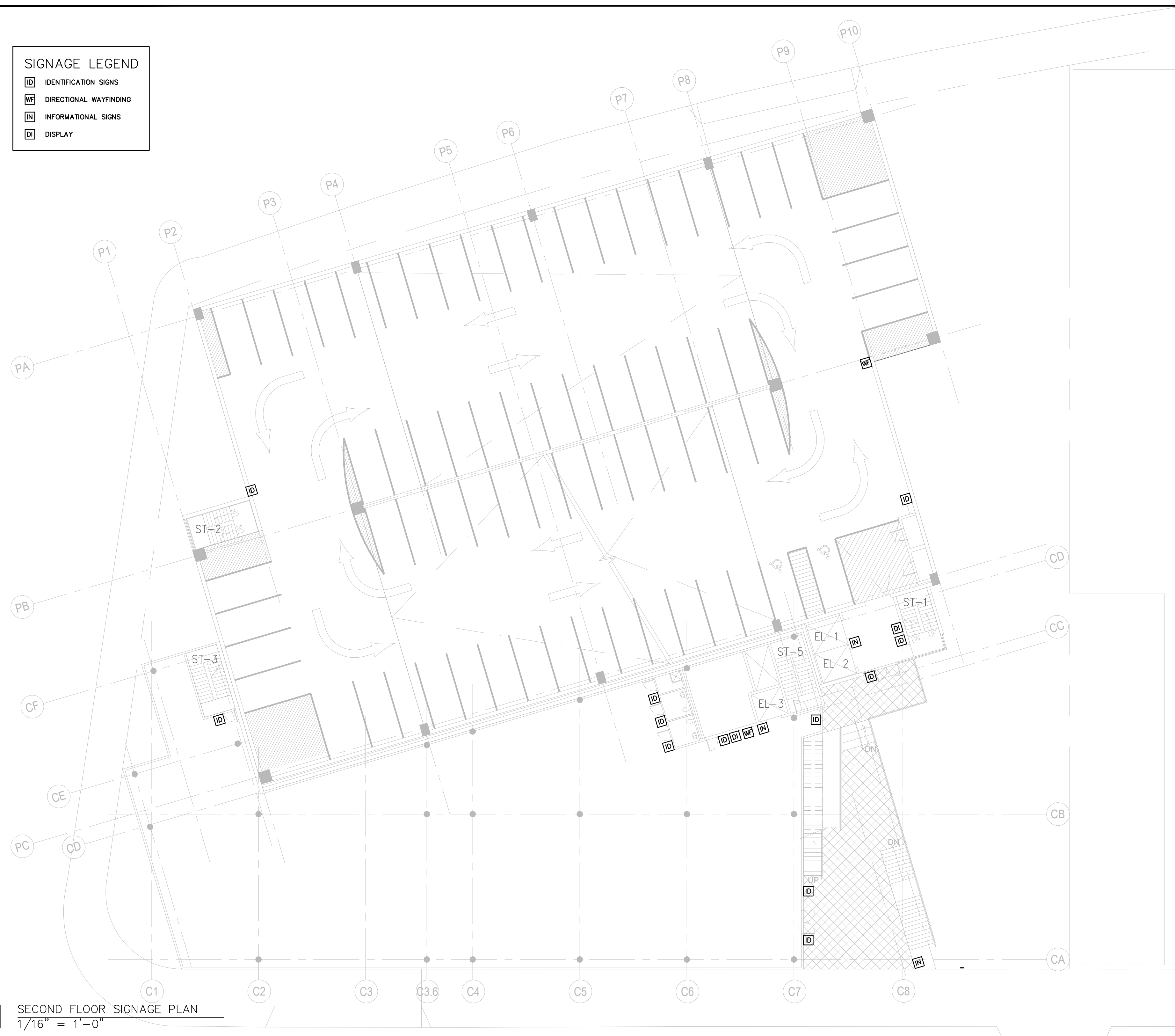
SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**WF-102**  
DRAWING ORDER:

**SIGNAGE LEGEND**

- ID IDENTIFICATION SIGNS
- WF DIRECTIONAL WAYFINDING
- IN INFORMATIONAL SIGNS
- DI DISPLAY



01 SECOND FLOOR SIGNAGE PLAN  
1/16" = 1'-0"

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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:



DRAWING TITLE:  
**THIRD FLOOR SIGNAGE PLAN**

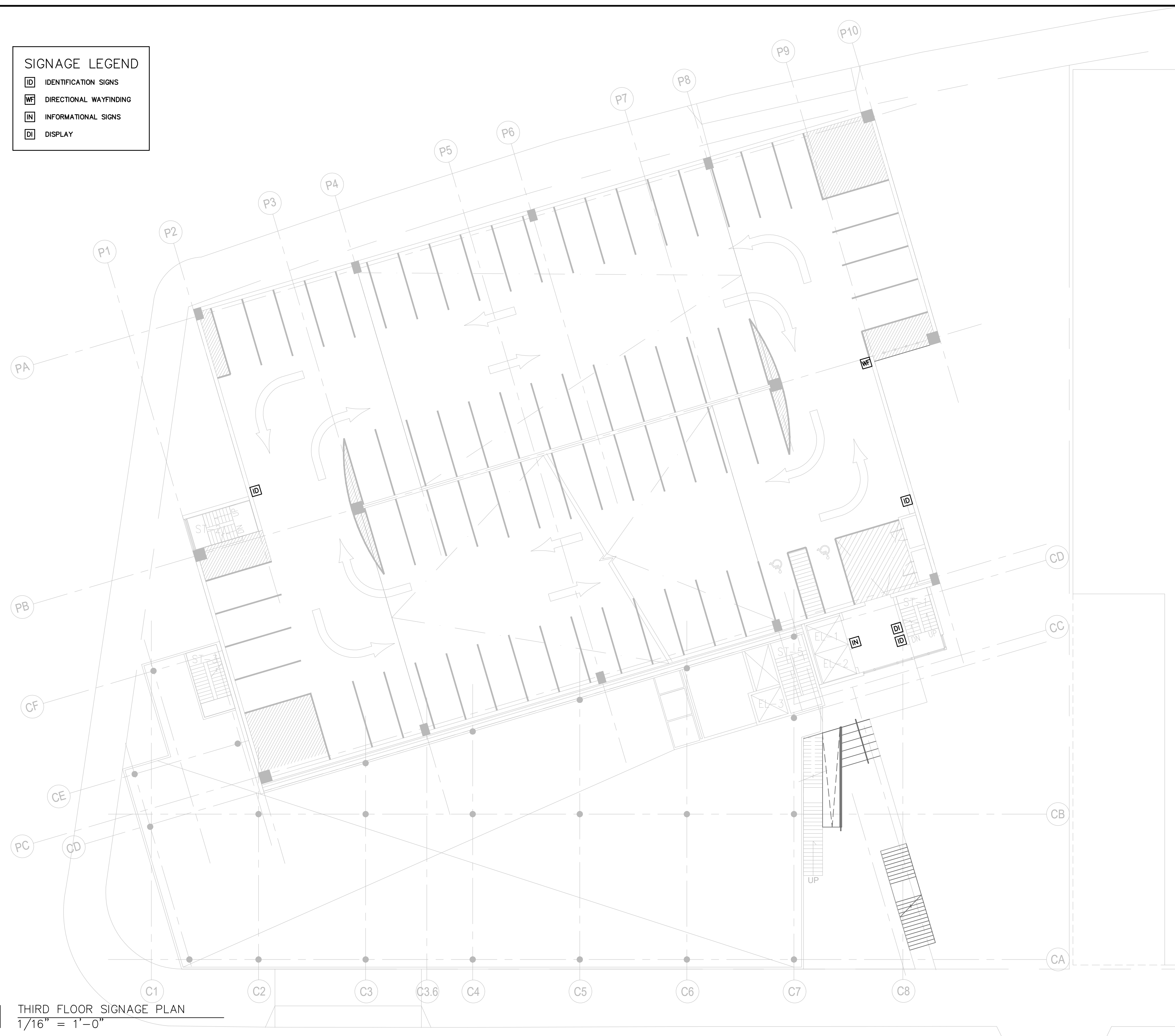
SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**WF-103**  
DRAWING ORDER:

**SIGNAGE LEGEND**

- ID IDENTIFICATION SIGNS
- WF DIRECTIONAL WAYFINDING
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01 THIRD FLOOR SIGNAGE PLAN  
1/16" = 1'-0"

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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:



DRAWING TITLE:  
**FOURTH FLOOR SIGNAGE PLAN**

SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**WF-104**  
DRAWING ORDER:

**SIGNAGE LEGEND**

- ID IDENTIFICATION SIGNS
- WF DIRECTIONAL WAYFINDING
- IN INFORMATIONAL SIGNS
- DI DISPLAY



**01** FOURTH FLOOR SIGNAGE PLAN  
1/16" = 1'-0"

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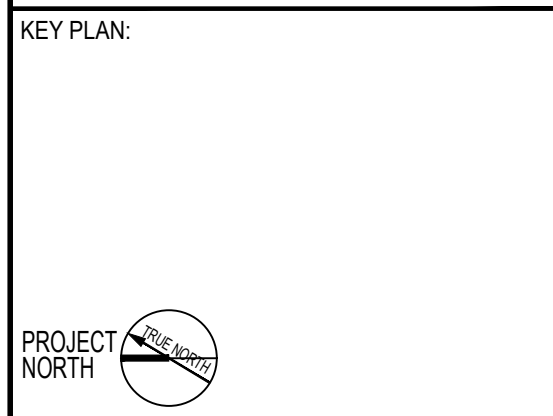
JFK&M ENGINEERS, LLP  
134 West 37th Street New York, NY 10018  
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REVISION	DESCRIPTION	DATE


PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:



PROJECT NORTH



DRAWING TITLE:  
**FIFTH FLOOR SIGNAGE PLAN**

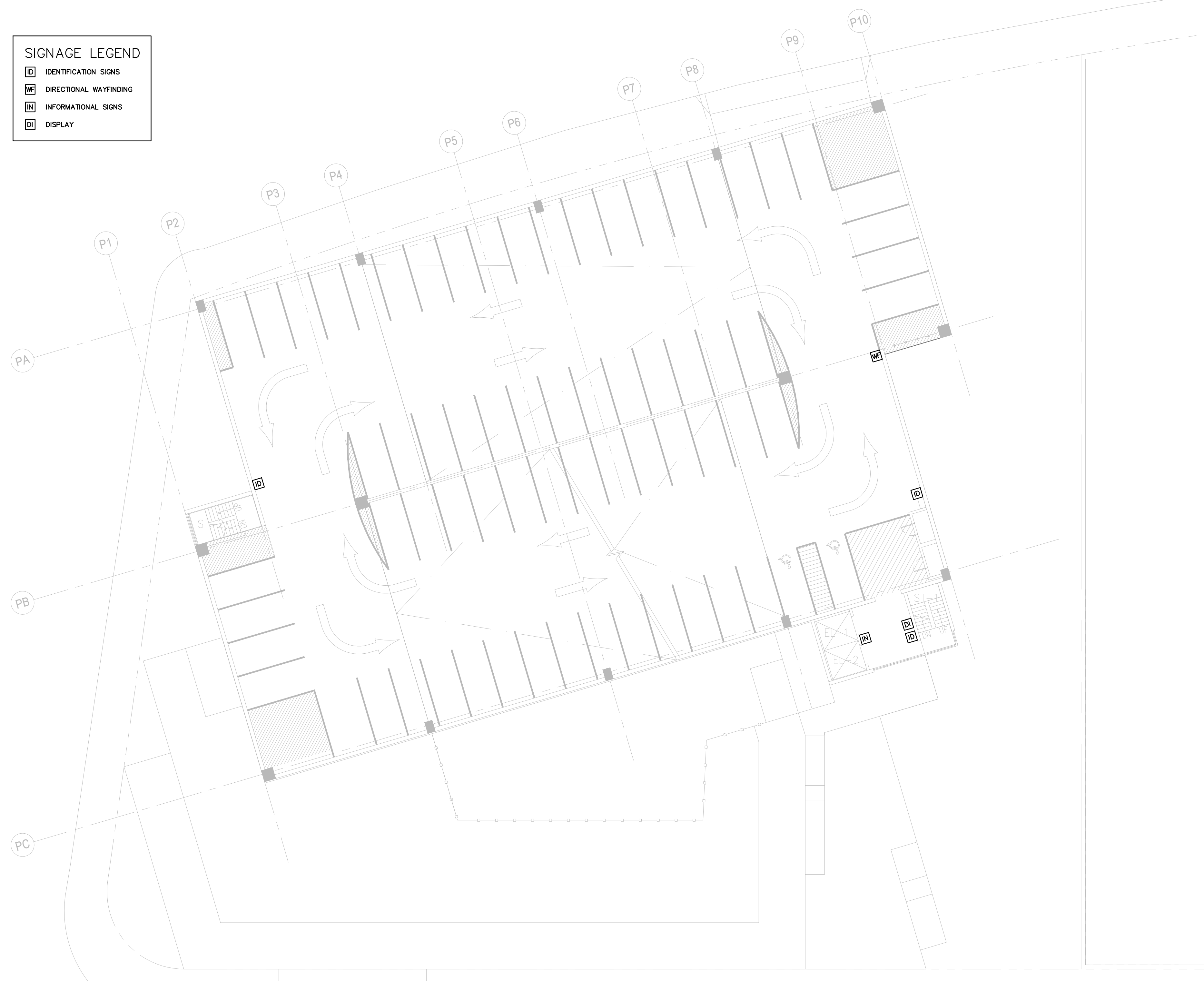
SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**WF-105**  
DRAWING ORDER: 202 of 205

**SIGNAGE LEGEND**

- ID IDENTIFICATION SIGNS
- WF DIRECTIONAL WAYFINDING
- IN INFORMATIONAL SIGNS
- DI DISPLAY



**01** FIFTH FLOOR SIGNAGE PLAN  
1/16" = 1'-0"



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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:



DRAWING TITLE:  
**SIXTH FLOOR SIGNAGE PLAN**

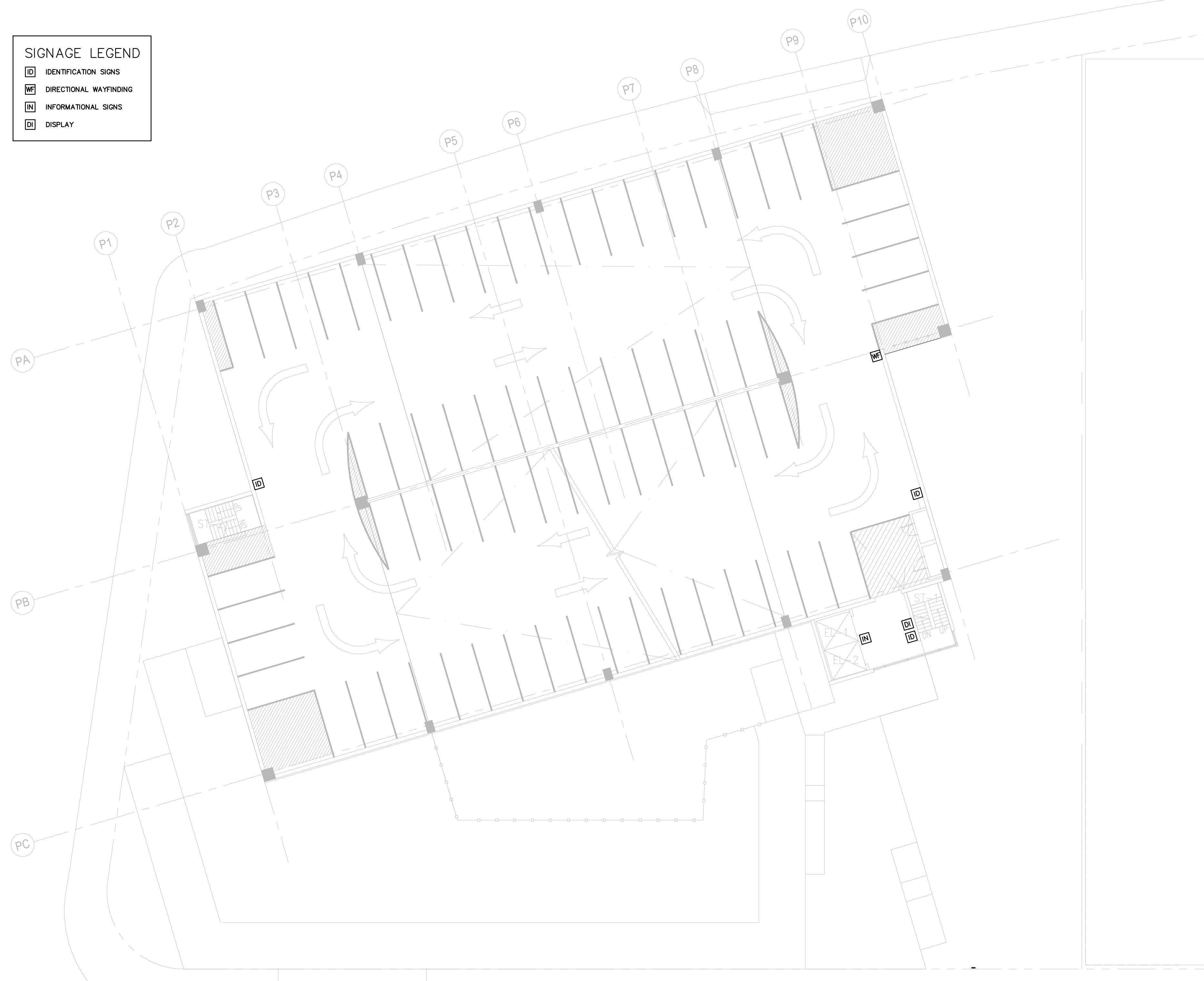
SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**WF-106**  
DRAWING ORDER: 203 of 205

**SIGNAGE LEGEND**

<b>ID</b>	IDENTIFICATION SIGNS
<b>WF</b>	DIRECTIONAL WAYFINDING
<b>IN</b>	INFORMATIONAL SIGNS
<b>DI</b>	DISPLAY



**01** SIXTH FLOOR SIGNAGE PLAN  
1/16" = 1'-0"

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REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:



DRAWING TITLE:  
**SEVENTH FLOOR SIGNAGE PLAN**

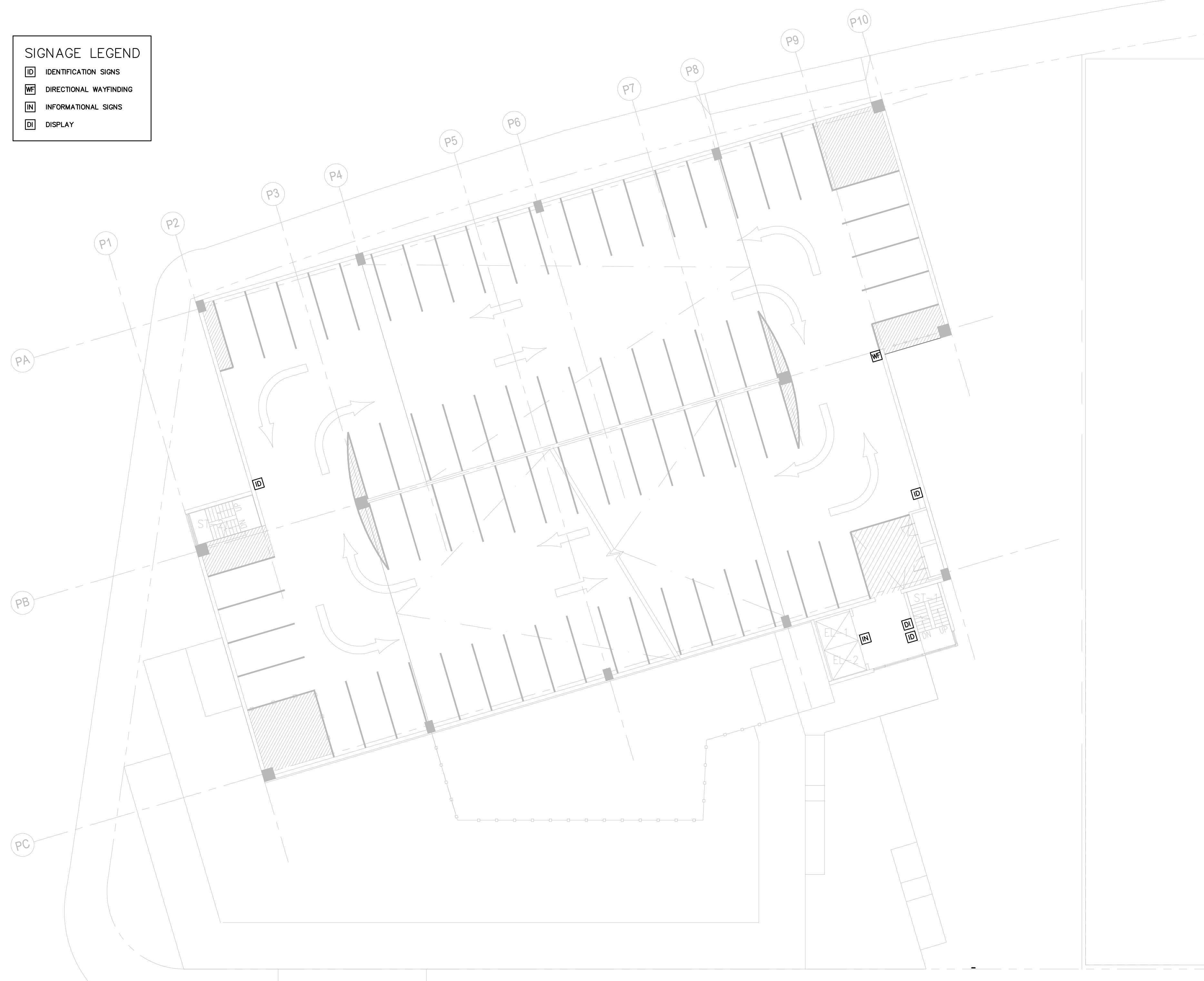
SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**WF-107**  
DRAWING ORDER: 204 of 205

**SIGNAGE LEGEND**

- ID IDENTIFICATION SIGNS
- WF DIRECTIONAL WAYFINDING
- IN INFORMATIONAL SIGNS
- DI DISPLAY



**01 SEVENTH FLOOR SIGNAGE PLAN**  
1/16" = 1'-0"

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212.699.4749

URBAHN ARCHITECTS  
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80 Pine Street New York, NY 10015  
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134 West 37th Street New York, NY 10018  
212.792.8700

REVISION	DESCRIPTION	DATE

PROJECT: NYC BBJ  
**QUEENS GARAGE & COMMUNITY SPACE**  
80-25 126th St,  
Kew Gardens, NY 11415

**TECHNICAL DRAWINGS**

KEY PLAN:



DRAWING TITLE:  
**EIGHTH FLOOR SIGNAGE PLAN**

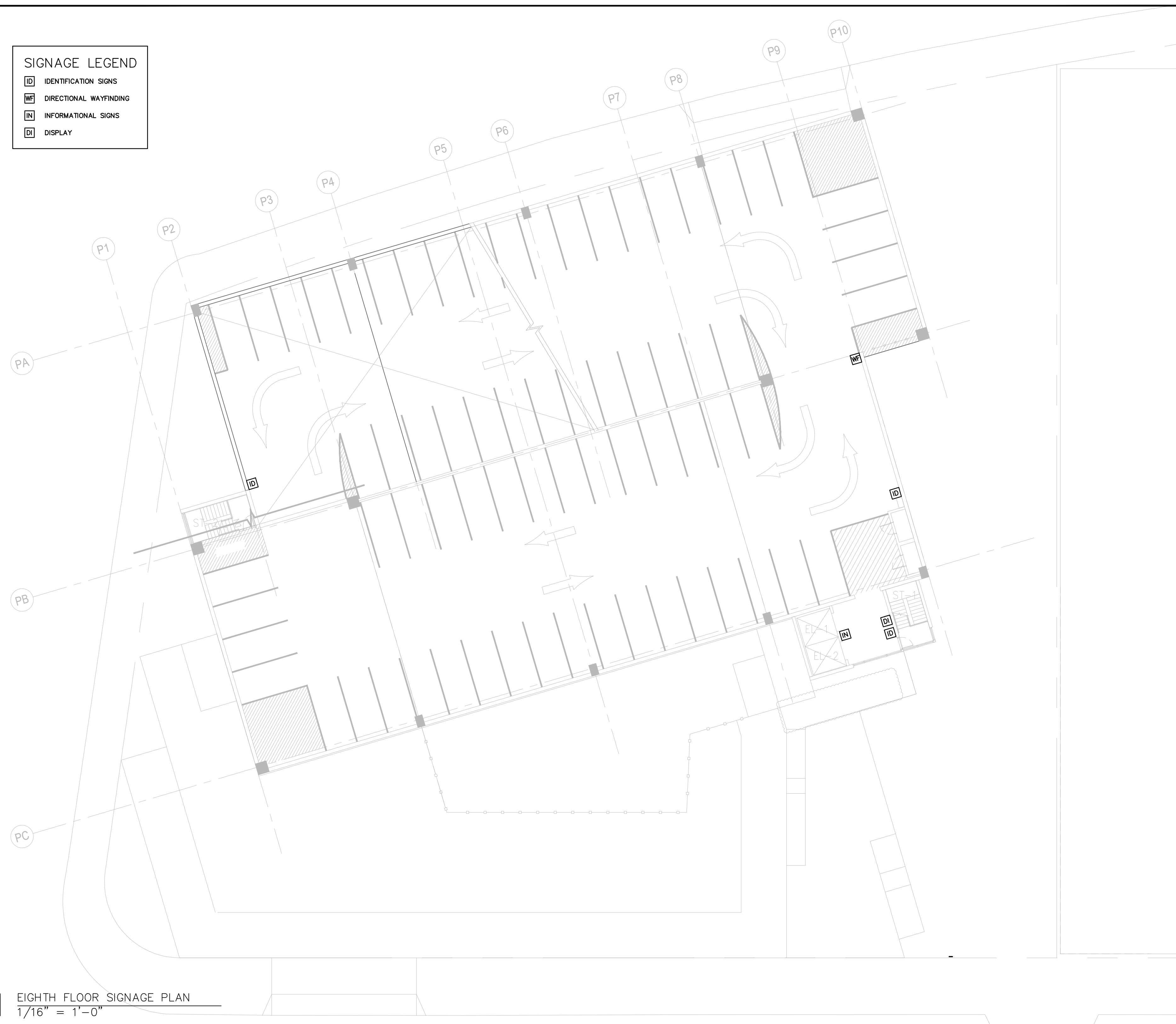
SCALE: 1/16" = 1'-0" DATE: SEPTEMBER 18, 2020

SEAL:

DRAWING NUMBER:  
**WF-108**  
DRAWING ORDER: 205 of 205

**SIGNAGE LEGEND**

<b>ID</b>	IDENTIFICATION SIGNS
<b>WF</b>	DIRECTIONAL WAYFINDING
<b>IN</b>	INFORMATIONAL SIGNS
<b>DI</b>	DISPLAY



01 EIGHTH FLOOR SIGNAGE PLAN  
1/16" = 1'-0"

# OUTLINE SPECIFICATIONS



NYC DESIGN-BUILD BOROUGH BASED JAILS  
QUEENS GARAGE AND COMMUNITY SPACE

PIN: 8502020CR0040P-42P

TECHNICAL SUBMISSION  
OUTLINE SPECIFICATIONS



NYC DESIGN-BUILD BOROUGH BASED JAILS  
QUEENS GARAGE AND COMMUNITY SPACE

PIN: 8502020CR0040P-42P

TECHNICAL SUBMISSION  
OUTLINE SPECIFICATIONS

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TABLE OF CONTENTSDIVISION 1 - GENERAL REQUIREMENTS –

The majority of General Requirements will be set set forth per RFP and Design Build Agreement unless otherwise noted by DDC. Some supplemental sections regarding Environmental work, sustainability requirements, and Structural testing are included as noted below.

01 35 43	Environmental Procedures
01 45 00	Quality Assurance: Structural Testing and Inspection
01 51 00	Construction Indoor Air Quality
01 74 19	Construction Waste Management and Disposal
01 81 13	Sustainable Design Requirements

DIVISION 2- EXISTING CONDITIONSSECTION

02 41 19	Selective Structure Demolition
----------	--------------------------------

DIVISION 3 - CONCRETESECTION

03 10 00	Concrete Formwork
03 20 00	Concrete Reinforcement and Embedded Assemblies
03 30 00	Cast in Place Concrete, Structural
03 41 00	Structural Precast Concrete with Commercial Architectural Finish
03 45 00	Precast Architectural Concrete

DIVISION 4 - MASONRYSECTION

04 22 00	Concrete Unit Masonry
04 43 13.13	Anchored Stone Masonry Veneer



DIVISION 5 - METALS

SECTION

05 12 00	Structural Steel
05 30 00	Steel Deck
05 40 00	Cold Formed Metal Framing
05 50 00	Metal Fabrications
05 51 13	Metal Pan Stairs
05 73 00	Decorative Metal Railings
05 77 00	Decorative Extruded Metal Fin Screens

DIVISION 6 - WOOD, PLASTICS AND COMPOSITES

SECTION

06 10 00	Rough Carpentry
06 16 00	Sheathing

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

SECTION

07 11 13	Bituminous Damp Proofing
07 13 26	Self Adhering Sheet Water Proofing
07 18 00	Traffic Membrane
07 19 00	Concrete Sealer
07 21 19	Foamed in Place Insulation
07 26 00	Vapor Retarders
07 27 26	Fluid Applied Membrane Air Barriers
07 42 13.13	Formed Metal Wall Panels
07 56 00	Reinforced Cold Fluid Applied Roofing
07 62 00	Sheet Metal Flashing and Trim
07 72 73	Vegetated Roof Systems
07 81 00	Applied Fire Protection
07 84 13	Penetration Fire Stopping





07 84 43	Joint Firestopping
07 92 00	Joint Sealants
07 92 10	Joint Sealants for Parking Deck
07 95 13.16	Exterior Expansion Joint Cover Assemblies
07 95 13.19	Parking Deck Expansion Joint Cover Assemblies

## DIVISION 8 - OPENINGS

### SECTION

08 11 13	Hollow Metal Doors and Frames
08 33 26	Overhead Coiling Grilles
08 42 13	Aluminum Framed Entrances
08 51 13	Aluminum Windows
08 71 00	Door Hardware
08 80 00	Glazing
08 91 19	Fixed Louvers

## DIVISION 9 - FINISHES

### SECTION

09 21 16.23	Gypsum Board Shaft Wall Assemblies
09 29 00	Gypsum Board
09 91 13	Exterior Painting
09 91 23	Interior Painting

## DIVISION 10 - SPECIALITIES

### SECTION

10 14 00	Signage
10 28 00	Toilet Accessories
10 44 16	Fire Extinguishers

DIVISION 11 – EQUIPMENT

SECTION

11 12 00            Parking Control Equipment

DIVISION 12 - FURNISHINGS

SECTION

12 93 10            Bicycle Racks

DIVISION 14 – CONVEYING EQUIPMENT

Hunter Roberts is in the process of evaluating the elevator design and specifications, and may opt to incorporate MRL type elevators. We will provide a MRL specifications.

SECTION

14 21 00            Gearless Overhead Traction Elevators  
14 24 00            Hydraulic Elevators

DIVISION 21 – FIRE PROTECTION

SECTION

21 05 17            Sleeves and Sleeve Seals for Fire Suppression Piping  
21 05 18            Escutcheons for Fire-Suppression Piping  
21 05 53            Identification for Fire-Suppression Piping and Equipment  
21 12 00            Fire-Suppression Standpipes  
21 13 13            Wet-Pipe Sprinkler Systems  
21 13 39            Dry-Pipe Sprinkler Systems  
21 3113            Electric Drive Centrifugal Fire Pumps  
21 34 00            Pressure-Maintenance Pumps  
21 39 00            Controllers for Fire Pump Drivers

DIVISION 22 – PLUMBING

SECTION

22 05 17	Sleeves and Sleeve Seals for Plumbing Piping
22 05 18	Escutcheons for Plumbing Piping
22 05 19	Meters and Gages for Plumbing Piping
22 05 23	General Duty Valves for Plumbing Piping
22 05 29	Hangers and Supports for Plumbing Piping and Equipment
22 05 33	Heat Tracing for Plumbing Piping
22 05 53	Identification for Plumbing Piping and Equipment
22 07 19	Plumbing Piping Insulation
22 09 19	Domestic Water System Pumps
22 11 13	Facility Water Distribution Piping
22 11 16	Domestic Water Piping
22 11 17	Grey Water Piping
22 11 19	Domestic Water Piping Specialities
22 13 13	Facility Sanitary Sewers
22 13 16	Sanitary Waste and Vent Piping
22 13 19	Sanitary Waste Piping Specialities
22 13 63	Grey Water Storage Tanks
22 14 23	Storm Drainage Piping
22 33 00	Electric Domestic Water Heaters
22 43 00	Plumbing Fixtures

DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

SECTION

23 01 00	Operation and Maintenance of HVAC Systems
23 05 00	Common Work Results for HVAC Work
23 05 13	Common Motor Requirements for HVAC Equipment
23 05 14	Common Motor Control Requirements for HVAC Equipment
23 05 15	Variable Frequency Motor Controllers for HVAC Equipment



23 05 19	Meters and Gauges for HVAC Piping
23 05 23	General-Duty Valves for HVAC Piping
23 05 24	Relief Valves for HVAC Systems and Equipment
23 05 25	Strainers for HVAC Systems
23 05 29	Hangers and Supports for HVAC Piping, Ducts and Equipment
23 05 48.16	Vibration Isolation for HVAC Piping, Ducts and Equipment
23 05 53	Identification for HVAC Piping and Equipment
23 05 93	Testing, Adjusting and Balancing for HVAC
23 07 00	HVAC Insulation
23 09 00	Instrumentation and Control for HVAC Systems
23 09 93	HVAC Sequences of Operations
23 21 13	Piping for HVAC Systems and Equipment
23 21 16	Hydronic Piping Specialties
23 21 23	Hydronic Pumps for HVAC
23 25 00	HVAC Water Treatment
23 25 17	HVAC Water Filtration Systems
23 31 13	Metal Ducts
23 31 19	HVAC Casings and Plenums
23 33 13	Dampers
23 33 19	Duct Silencers and Acoustic Treatment
23 33 33	Ducts, Casings and Plenum-Mounted Access Doors
23 33 43	Flexible Connectors
23 34 00	HVAC Fans
23 37 13	Diffusers, Registers and Grilles
23 41 00	HVAC Air Filtration Products
23 64 23.10	Air Cooled Scroll Chiller/Heaters
23 74 13	Packaged Outdoor Central-Station Air Conditioning Units
23 81 23	Packaged Self-Contained Computer Room Air Conditioners (CRAC)
23 81 26	Split-System Air-Conditioners
23 82 16	Cooling and Heating Air Coils (Water)
23 82 39	Unit Heaters

DIVISION 26 - ELECTRICAL

SECTION

26 05 00	Common Work Results for Electrical
26 05 06.03	Electrical Service
26 05 07	Access Doors and Color-Coded Identification in General Construction
26 05 19	Low-Voltage Electrical Power Conductors and Cables
26 05 20	Heating Cable
26 05 26	Grounding and Bonding for Electrical Systems
26 05 29	Hangers and Supports for Electrical Systems
26 05 33	Raceway and Boxes for Electrical Systems
26 05 43	Underground Ducts and Raceways for Electrical Systems
26 05 48.16	Vibration Isolation for Electrical Systems
26 05 53	Identification for Electrical Systems
26 05 73	Overcurrent Protective Device Coordination, Short Circuit and Arc-Flash Analysis
26 09 23	Lighting Control Devices
26 22 13	Low-Voltage Distribution Transformers
26 24 13	Switchboards
26 24 16	Panelboards
26 27 13	Electricity Submetering
26 27 26	Wiring Devices
26 28 13	Fuses
26 28 16	Enclosed Switches and Circuit Breakers
26 32 13.13	Diesel Engine-Driven Generator Set[s]
26 33 23.13	Station Battery System
26 33 53.13	Emergency Lighting Inverter System
26 36 23	Automatic Transfer Switches
26 41 13	Lightning Protection for Structures
26 43 00	Surge Protection Device System
26 51 00	Interior Lighting
26 56 00	Exterior Lighting



DIVISION 27 - COMMUNICATIONS

SECTION

27 03 00	Communications Fiberoptic Cabling
27 05 06	Grounding and Bonding for Communications Systems
27 05 28.33	Conduits and Backboxes for Communications Systems
27 11 00	Communications Equipment Room Fittings
27 13 00	Communications Backbone Cabling
27 13 13	Communications Copper Backbone Cabling
27 15 00	Communications Horizontal Cabling
27 16 00	Communications Connecting Cords, Devices and Adapters

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

SECTION

28 05 00	Common Work Results for Security Management Systems
28 05 13	Conductors and Cables for Security Management Systems
28 05 26	Grounding and Bonding for Security Management Systems
28 13 00	Access Control for Security Management Systems
28 16 00	Intrusion Detection for Security Management Systems
28 23 00	Video Surveillance for Security Management
28 31 11	Addressable Fire Alarm System



DIVISION 31 – EARTHWORK

SECTION

31 10 00	Site Clearing
31 12 00	Earth Moving
31 23 19	Dewatering
31 50 00	Excavation Support and Protection

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION

32 12 16	Asphalt Paving
32 12 64	Pavement Joint Sealants
32 13 13	Concrete Paving
32 17 23	Pavement Markings
32 17 26	Tactile Warning Surfacing
32 84 00	Planting Irrigation
32 92 00	Turf and Grasses

DIVISION 33 – UTILITIES

SECTION

33 46 00	Sub-drainage
33 49 23	Storm Detention Structures

END OF TABLE OF CONTENTS



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

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SECTION 01 35 43

ENVIRONMENTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. The Contractor is responsible for protection of the environment and the preservation of natural resources within the project boundaries and outside the limits of permanent work. The Contractor is to restore to an equivalent or improved condition upon completion of work. Confine construction activities to within the limits of the work indicated or specified.
- B. Protection of the environment is to include, but not limited to; Dust and Air Monitoring Controls, Noise Control, Management and disposal of debris and other environmentally regulated materials, Spill Prevention and Response, Sediment and Erosion Control.

1.2 QUALITY ASSURANCE

- A. Not used

1.3 SUSTAINABILITY REQUIREMENTS

- A. Not used

PART 2 - PRODUCTS

2.1 PRODUCTS

- A. Not used

2.2 PERFORMANCE REQUIREMENTS

- A. Not used

PART 3 - EXECUTION

3.1 GENERAL EXECUTION REQUIREMENTS

- A. Comply with all applicable Federal, State, laws, ordinances and regulations pertaining to environmental protection to include but not limited to the programs in the New York State Department of Environmental Conservation (DEC) Division of Environmental Remediation (DER) and Commissioner Policies (CP).
- B. The Contractor must ensure that all other contractors, subcontractors and other personnel performing work are fully aware of all permit conditions, plans and programs.



- C. Equipment with factory-installed, anti-pollution and noise control devices should be properly maintained and in working order prior to use.
- D. All permits pertaining to the job and a copy of the final construction plans are to be kept on-site and made available for inspection by the Engineer or any regulatory representatives. Regulatory representatives with the appropriate credentials and identification should be allowed on-site at reasonable times to ensure compliance with all applicable laws and regulations. The Engineer is to be notified of any regulatory representatives visiting the work site.
- E. The Contractor shall dispose of all waste, demolition, excavation material at a site approved for the disposal of such material in accordance applicable Federal, State and City regulations and Section and Section 02 61 13.

3.2 NOISE CONTROL

3.3 DUST AND AIR MONITORING CONTROLS

3.4 RODENT AND INSECT CONTROL

3.5 ENVIRONMENTAL PROTECTION REQUIREMENTS

3.6 SPILL PREVENTION AND RESPONSE PLAN

END OF SECTION 01 35 43



SECTION 01 45 00

QUALITY ASSURANCE: STRUCTURAL TESTING AND INSPECTION

PART 1 - GENERAL

1.1 GENERAL

- A. Quality assurance is testing and inspection to assist the Owner in evaluating the Contractor's performance and quality control in the fabrication shop and field. It is not a substitute for the testing and inspection which is required as part of the Contractor's quality control program.

1.2 SCOPE

- A. Testing Agency shall provide qualified personnel at the site to test and inspect materials installed by and work performed by the Contractor, for the following structural items as indicated in Part 3 of this Specification section:

1. Section 03 10 00 Concrete Formwork
2. Section 03 20 00 Concrete Reinforcement and Embedded Assemblies
3. Section 03 30 00 Cast-In-Place Concrete
4. Section 04 22 00 Concrete Masonry Units
5. Section 05 12 00 Structural Steel
6. Section 05 30 00 Steel Deck

1.3 TESTING AGENCY QUALIFICATIONS

- A. Testing Agency shall be an independent agency with the experience and capability to conduct testing, inspection and sampling as indicated in accordance with ASTM E 329.
- B. Testing Agency shall be an agency approved by the local building official to perform Special Inspections and other related services as outlined in the governing project Building Code.
- C. Testing, inspection, and sampling shall be done in accordance with the applicable ASTM standards.



- D. Personnel performing visual inspection and non-destructive testing of welds shall meet the requirements of AWS D1.1 for weld inspectors and shall have current certification as an AWS Certified Welding Inspector.

#### 1.4 TESTING AGENCY RESPONSIBILITIES

- A. Provide qualified personnel at the site to test and inspect structural construction as the work progresses using the most current Contract Documents and approved shop drawings.

#### 1.5 CONTRACTOR RESPONSIBILITIES

- A. The Contractor shall have sole responsibility for coordinating their work with the Testing Agency to assure that all test and inspection procedures required by the Contract Documents and Public Agencies are provided.

### PART 2 - PRODUCTS (NOT USED)

### PART 3 - EXECUTION

#### 3.1 GENERAL

- A. Testing Agency shall provide qualified personnel at site to test and inspect structural construction using the latest Contract Documents and approved submittals as indicated in the following sections.

#### 3.2 CONCRETE FORMWORK

- A. Quality Assurance:

- 1. Prior to placement of reinforcement, inspect formwork for grade, quality of material, absence of foreign matter, and other imperfections that might affect concrete placement and tolerances stated herein.

#### 3.3 CONCRETE REINFORCEMENT AND EMBEDDED ITEMS

- A. Quality Assurance:



1. Prior to placement, inspect reinforcement and embeds for grade, quality of material, absence of foreign matter, and for suitable storage.
2. Periodic inspection for post-installed adhesive and mechanical anchors shall be provided in accordance with the building code except that continuous inspection shall be provided for the conditions identified in section B.4.

### 3.4 CAST-IN-PLACE CONCRETE

- A. Source Quality Assurance: The Owner's Testing Agency shall conduct concrete quality evaluations for compliance with Specifications as follows:
- a) Review and test Contractor's proposed materials.
  - b) Review and test Contractor's proposed concrete mix designs.
  - c) Confirm production samples at plants or stockpiles are consistent with approved mix designs and mixing operations to extent deemed necessary to assure compliance with ASTM C94
  - d) Continuously inspect quality and quantity of materials used in transit mixed concrete, in batched aggregates and ready-mixed concrete at mixing plant or other location per California Building Code Section 1913A and 17A where other materials are measured.]
- B. Quality Assurance:
1. Monitor concrete placement as follows:
    - a) Verify use of required design mix
    - b) Record location of point of concrete discharge of each batch truck tested, cross referenced to grid lines.
    - c) Record temperature of concrete at time of placement.
    - d) Record weather conditions at time of placement, including temperature, wind speed, relative humidity, and precipitation.
    - e) Record types and amounts of admixtures added to concrete at the project site.
    - f) Record amount of water added at the site and verify that total water content does not exceed amount specified in the mix design. Addition of water at the site is subject to prior approval by the Design Professional.
    - g) Monitor consistency and uniformity of concrete.
    - h) Monitor preparation for concreting operations, placement of concrete, and subsequent curing period for conformance with Specifications for following procedures:
      - i. Concrete curing.
      - ii. Hot weather concreting operations.
      - iii. Cold weather concreting operations.



2. Conduct tests of concrete as follows and in accordance with ASTM C 1077:
  - a) Testing frequency: Sample sets for all tests listed below of each concrete design mix placed each day shall be taken not less than once a day, nor less than once for each 50 cubic yards (40 cubic meters) of concrete, nor less than once for each 2500 square feet (250 square meters) of surface area for slabs or walls. Additional tests shall be performed if deemed necessary by the Owner's Testing Agency and Design Professionals. In addition, sample each truckload used for columns and piers, regardless of other frequencies listed above.
  - b) Obtain each test sample from different batches selected on a strictly random basis before commencement of concrete placement. Record location in structure of sampled concrete.
  - c) Determine air content of normal weight concrete in accordance with either ASTM C 231 or ASTM C 138. Determine air content of lightweight concrete in accordance with ASTM C 173. Conduct one test for air content for each strength test required or for every 50 cubic yards (40 cubic meters) of fly ash concrete placed, whichever is less.
  - d) Determine unit weight of lightweight concrete in accordance with ASTM C 567.
  - e) Test water content of freshly mixed concrete on a random basis, a minimum of once per 100 cubic yards (75 cubic meters) or every 5000 square feet (500 square meters) of concrete placement, during placement in accordance with AASHTO T 318 for the following concrete types:
    - i. Hard troweled slabs exposed to view
    - ii. Slab to receive a bonded finish floor material
    - iii. Slabs with specified concrete compressive strength exceeding 6000 psi (42MPa)
  - f) Conduct slump tests in accordance with ASTM C 143.
  - g) Slump indicated in mix designs shall be achieved at point of placement. Correlation between slump at point of initial discharge from truck and point of placement must be established to determine amount of slump loss which occurs between initial discharge and point of placement. Adjustment may be necessary to achieve slump indicated in mix designs at point of placement.
  - h) Conduct slump tests for Self Consolidating Concrete (SCC) as follows
    - i. In accordance with ACI 237, where SCC is used, perform slump flow and visual stability index tests in accordance with ASTM C1611 on the first batch of SCC, and then consecutive batches until two consecutively produced batches are within specification. SCC with a visual stability index value of 2 or 3 shall be stabilized, where possible, with a viscosity modifying admixture or rejected at the discretion of the Engineer and Ready Mix Quality Control Representative. The Ready Mix Producer shall be responsible for adjusting the mix to provide desired flow and stability. After establishing the consistency of the SCC mix, testing shall continue in accordance with the requirements of the above paragraph.



- ii. In accordance with ACI 237, where SCC is used, perform slump flow tests in accordance with ASTM C1621 using a J-ring to determine the passing ability of the SCC mix around reinforcement. If the reinforcing bars retain the coarse aggregates inside the ring, the mixture has a high potential for blocking and should be reportioned at the direction of the Engineer and Ready Mix Quality Control Representative.
- i) Conduct strength tests of concrete as follows:
  - i. Secure sample sets in accordance with ASTM C 172.
  - ii. Mold cylinders in accordance with ASTM C 31 and cure under standard moisture and temperature conditions in accordance with ASTM C 31, Section 7 (a). Quantity of cylinders listed below is based on a cylinder size of 4 inch (100mm) diameter x 8 inches (200mm) long. If 6 inch (150mm) diameter by 12 inch (300mm) long cylinders are used, the total quantity of cylinders may be reduced by one with two cylinders instead of three tested at the age designated for determination of f'c.
  - iii. For 28 day mixes mold six cylinders. Test two cylinders at seven days and three cylinders at 28 days. The 28 day strength shall be the average of the three 28 day cylinders. One cylinder shall be retained in reserve for later testing if required.
  - iv. When high early strength concrete is required by Contractor, additional cylinders shall be made and tested as required at Contractor's expense.
  - v. If one cylinder in a test manifests evidence of improper sampling, molding or other damage, discard cylinder and base test results on that of remaining cylinder.
- 3. Evaluate concrete for conformance with Specifications as follows:
  - a) Slump:
  - b) Strength test:
  - c) Conduct core tests on questionable concrete in accordance with ACI 318 and ASTM C 42.
  - d)
  - e) Floor flatness and levelness tolerance compliance testing is to be performed within 72 hours of concrete placement by Testing Agency, and prior to the removal of shores and forms.

### 3.5 CONCRETE MASONRY UNITS

#### A. Quality Assurance:

##### 1. Testing Requirements:



- a) Mortar:
- b) Grout: The following testing requirements are for grout proportions determined by specified compressive strength only:
- c) Compressive strength of masonry ( $f_m$ ), unit strength method:

2. Inspection Requirements:

- a) Inspect and verify the following items periodically unless otherwise noted as continuous. Periodic inspections shall be random and unannounced and shall occur at least once per week. Where items are noted as continuous, inspections shall be performed whenever and wherever the work is being performed.

### 3.6 STRUCTURAL STEEL

A. Quality Assurance:

1. Shop inspection shall include alignment and straightness of members, camber, preparation for connections, dimensional checks, testing of shop bolts, witnessing of welding procedures, testing of cuts, weld access holes and copes of Heavy Sections as defined in this Specification, examination and testing of completed welds, headed studs and deformed bar anchors, cutting of Heavy Sections, finishing of column ends, cleaning, painting and storage of material. All shop fabrication shall be inspected in the shop. Camber shall be verified in a minimum of 10% of all members requiring camber. If, in the opinion of the SER and Testing Agency this testing discloses a large ratio (10% or more) of unacceptable cambers, the required percentage of tested cambers may be increased by the SER to 100% at no expense to the Owner. Where testing is required for less than 100% of locations, select test locations at random and throughout the project.
2. Field inspection shall include connections, proper tensioning of bolts, levelness, plumbness and alignment of the frame, conformance to AWS welding methods, examination of surface before welding, examination and testing of completed welds, headed studs and deformed bar anchors and field painting, including touch-up. Where testing is required for less than 100% of locations, select test locations at random and throughout the project.
3. Review the following items in the shop and field:
  - a) Welding certificates, procedures, and personnel
  - b) Stud welding setup and operators; bolting procedure and crew
  - c) Bolting procedure and crew
  - d) Visually inspect seam welds of tube and pipe for evidence of cracking or lack of fusion. At each end piece of tube or pipe, inspect interior face of seam weld for evidence of cracking, lack of fusion, or less than full flashing.
  - e) Mill certifications for compliance with the Contract Documents.





4. Inspect high strength bolted construction in accordance with RCSC "Specification for Structural Joints using ASTM A 325 or A 490 Bolts,"
5. Test and inspect welding and welded construction
6. Visually inspect all headed studs and deformed bar anchors for complete fusion and full 360-degree weld flash (or fillet).
7. Cleaning & Painting

### 3.7 STEEL DECK

#### A. Quality Assurance:

1. Prior to erection of steel deck: Review all analysis and certificates of compliance. Certificates shall include verification of base metal thickness and galvanized coating as required by applicable ASTM standards.
2. Decking is subject to inspection and testing once connected in place:
3. Field inspect all steel deck after erection
4. Field inspect headed studs (shear connectors)

### 3.8 FOOTINGS

#### A. Quality Assurance by Geotechnical Engineer (or Testing Agency if the same entity):

1. Review Contractor's proposed footing installation methods, sequences, and procedures.
2. Verify bearing stratum and bearing capacity of each footing; verify levelness of footing end bearing surface.
3. Determine final bearing elevation at each footing location.
4. Observe, record, and report footing as-built plan location, footing size and final elevations of bottom (where possible) and top of completed footings.
5. Coordinate with Testing Agency.

#### B. Quality Assurance by Testing Agency:

1. Inspection of Batch Plant: As required to ensure that concrete delivered to job complies with Specifications and design mix. Batch plant inspection shall be required once at start of job and thereafter if concrete falls below Specifications.
2. Inspection of Reinforcement: Provide continuous visual inspection of site fabrication. Record the steel reinforcement bar sizes, grade, length, and number of bars.
3. Inspection of Concrete and Reinforcement Placement: Provide continuous visual inspection of installation of reinforcement and concrete placement including verification of laitance removal at top of footings.
4. Check ready mix delivery tickets for correct concrete mix design number. Record batch to placement time. Check slump, temperature, and batch to placement time for each set



5. Slump Tests: ASTM C143. Make one test from each truck.
6. Concrete Compressive Strength Tests: Testing agency will take a minimum of one sample set of concrete cylinders per 20 cubic yards of concrete. See CAST-IN-PLACE CONCRETE section of this specification for requirements. Cure cylinders to simulate same curing conditions as concrete in footings. Reports of cylinder tests shall state footing location(s), laboratory or site curing, compression strength, type of fracture, age at testing, concrete supplier, mix specification strength, any other pertinent information, test results, and conclusions.

END OF SECTION 01 45 00

SECTION 01 51 00  
CONSTRUCTION INDOOR AIR QUALITY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Section 018113 Sustainable Design Requirements

1.2 REQUIREMENTS INCLUDED IN THIS SECTION

- A. Indoor Air Quality Management Goals
- B. Indoor Air Quality Management Plan
- C. Indoor Air Quality Management Plan Implementation

1.3 INDOOR AIR QUALITY MANAGEMENT GOALS

- A. The Owner has established that this Project shall prevent indoor air quality problems resulting from the construction process, to sustain long-term installer and occupant health and comfort.
- B. Protect the ventilation system components during construction and cleanup of contaminated components after construction is complete.
- C. Control sources of potential Indoor Air Quality (IAQ) pollutants by controlling selection of materials and processes used in project construction.
- D. With regard to these goals the Contractor shall develop, for Owner and Architect's review, an IAQ Management Plan for this Project

PART 2 – PRODUCTS

2.1 SUBMITTALS:

- A. Construction IAQ Management Plan highlighting the five requirements of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd edition, 2007, ANSI/SMACNA 008–2008, Chapter 3, including a no-smoking policy.
- B. Photographs documenting construction IAQ management measures implemented during construction of each of the five SMACNA requirements.
- C. Cut sheets of filtration media used during construction and installed immediately prior to occupancy with MERV values highlighted.



- D. Submit a letter from the Contractor describing building flush-out procedures including actual dates of building flush-out, hours of ventilation, ventilation rates, and indoor temperature and humidity levels.

## 2.2 IAQ MANAGEMENT PLAN

- A. Develop a Draft Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the building as follows: (1) during construction meet or exceed the minimum requirements of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd edition, 2007, ANSI/SMACNA 008–2008, Chapter 3, (2) Protect stored on-site or installed absorptive materials from moisture damage, and (3) conduct a building flush-out after construction ends and prior to occupancy.
1. The SMACNA IAQ Guidelines for Occupied Buildings under Construction provides an overview of air pollution associated with construction, control measures, construction process management, quality control, communicating with occupants, and case studies. These guidelines can be accessed at [www.smacna.org](http://www.smacna.org). Chapter 3 of the SMACNA Guidelines recommends Control Measures in five areas: HVAC protection, source control, pathway interruption, housekeeping, and scheduling. Review the applicability of each Control Measure and include those that apply in the Draft IAQ Management Plan.
    - a. HVAC Protection: Shut down the return side of the HVAC system whenever possible during heavy construction. If the system must remain operational during construction include the following strategies that apply:
      - i. If conditioning is required during construction, use supplementary HVAC units instead of permanently installed equipment if possible.
      - ii. Seal all ductwork, registers, diffusers, and returns with plastic when stored on site or not in service. Seal unfinished runs of ductwork at the end of each day
      - iii. Fit the return side of the HVAC system with temporary filters.
      - iv. Isolate the return side of the HVAC system from the surrounding environment as much as possible (e.g., place all tiles for the ceiling plenum, repair all ducts and air handler leaks).
      - v. Damper off the return system in the heaviest work areas and seal the return system openings with plastic.
      - vi. Upgrade the filter efficiency where major loading is expected to affect operating HVAC system.
      - vii. Clean permanent return air ductwork per National Air Duct Cleaning Association standards upon completion of all construction and finish installation work.
      - viii. If permanently installed air handlers are used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 shall be used at each return air grille during construction, as determined by ASHRAE 52.2-1999.
      - ix. Install new clean media just prior to substantial completion and occupancy that has a Minimum Efficiency Reporting Value (MERV) of 13.
    - b. Source Control: Keep sources of contaminants out of the building and have a plan to eliminate any that are introduced:
      - i. Use low-toxicity and low-VOC materials to the greatest extent possible.
      - ii. Develop protocols for the use of any high-toxicity materials. Isolate areas where high-toxicity materials are being installed and use temporary ventilation for that area.
      - iii. Prevent exhaust fumes (from idling vehicles, equipment, and fossil-fueled tools) from entering the building.
      - iv. **Enforce the no-smoking job site policy.**



- v. Protect stored materials from moisture because absorbent materials exposed to moisture during construction can mold and degenerate long after installation. Store materials in dry conditions indoors, under cover, and off the ground or floor.
  - vi. If materials are improperly exposed to moisture, replace the material and consider testing air quality before occupancy to make sure no mold contamination has occurred.
- c. Pathway Interruption: Prevent contamination of clean spaces. Include the following strategies that apply:
- i. Use 100% outside air ventilation (when outside temperatures are between 55 degrees F and 85 degrees F and humidity is between 30% and 60%) with air exhausted directly to the outside during installation of finishes and other VOC emitting materials.
  - ii. Isolate areas of work to prevent contamination of other spaces, whether they are finished or not. Seal doorways, windows, or tent off areas as needed using temporary barriers, such as plastic separations. Provide walk-off mats at entryways to reduce introduced dirt and pollutants.
  - iii. Use dust guards and collectors on saws and other tools.
  - iv. Depressurize the work area to allow a differential between construction areas and clean areas. Exhaust to the outdoors using 100% outdoor air, if possible
- d. Housekeeping: Reduce construction contamination in the building prior to occupancy through HVAC and regular space cleaning activities.
- i. Maintain good job site housekeeping on a daily basis. Use vacuum cleaners with high-efficiency particulate filters and use sweeping compounds or wetting agents for dust control when sweeping
  - ii. Store building materials in a weather tight, clean area prior to unpacking for installation.
  - iii. Check for possible damage to the HVAC system and Building assemblies from high humidity.
  - iv. Clean all coils, air filters, and fans before testing and balancing procedures are performed.
- e. Scheduling: Specify construction sequencing to reduce absorption of VOC's by materials that act as sinks or contaminant sources. Complete application of wet and odor-emitting materials such as paints, sealants, and coatings before installing sink materials such as ceiling tiles, carpets, insulation, gypsum products, and fabric-covered furnishings are installed.
- i. Consider after-hours or weekend work if practical.
2. Protect stored on-site or installed absorptive materials from exposure to moisture through precipitation, plumbing leaks, or condensation from the HVAC system to prevent microbial contamination.

## PART 3 – EXECUTION

### 3.1 FLUSH-OUT

As part of Indoor air quality management, the following requirements have to be met:

*FLUSH OUT: Provide a summary data log sheet indicating outside air cfm provided on an hourly basis during flush out. Provide cut sheets of filters use during flush out and verify replacement air filters after flush out. Refer to Section 018113 for LEED requirements.*

Or



*AIR TESTING: Provide an IAQ Testing report that includes a narrative describing procedures and how locations were determined, and date/results of each test.*

- A. Building Flush Out: Select one of the following two options (prior to occupancy or during occupancy), to be implemented after construction ends and the building been completely cleaned. All interior finishes, such as millwork, doors, paint, carpet, acoustic tiles, and movable furnishing, must be installed, and major VOC punch list items must be finished.
- a. Prior to Building Occupancy: Prime Trade Contractor shall install new filtration media and perform a building flush-out by supplying a total air volume of 14,000 cubic feet of outdoor air per square foot of gross floor area while maintaining an internal temperature of at least 60°F (15°C) and no higher than 80°F (27°C) and relative humidity no higher than 60%. The duration of the flush-out must be calculated as follows:
- Cubic feet of outdoor air needed prior to occupancy = Area (ft<sup>2</sup>) X 14,000 cfm  
Duration (Days) = Cubic Feet needed/(air handler capacity/1440 minutes/day)
- i. Replace all outside air filtration media prior to occupancy. Filtration media shall have a MERV of 13 as determined by ASHRAE 52.2.
- b. During Occupancy: if occupancy is desired before the flush-out is completed, the space may be occupied only after delivery of a minimum of 3,500 cubic feet of outdoor air per square foot of gross floor area while maintaining an internal temperature of at least 60°F (15°C) and no higher than 80°F (27°C) and relative humidity no higher than 60%.

Once the space is occupied, it must be ventilated at a minimum rate of 0.30 cubic foot per minute (CFM) per square foot of outdoor air or the design minimum outdoor air rate determined by the ASHRAE 62.1-2010 calculations determined in IEQ Prerequisite Minimum indoor Air Quality performance, whichever is greater. During each day of the flush-out period, ventilation must begin at least three hours before occupancy and continue during occupancy. These conditions must be maintained until a total of 14,000 cubic feet per square foot of outdoor air has been delivered to the space. The duration of the flush-out must be calculated as follows:

Cubic feet of outdoor air needed prior to occupancy = Area (ft<sup>2</sup>) X 3,500 cfm  
Cubic feet of outdoor air needed during occupancy = Area (ft<sup>2</sup>) X 10,500 cfm  
Duration (Days) = (Area (ft<sup>2</sup>) X 14,00 cfm)/(air handler capacity/1440 minutes/day)

- B. IAQ Testing: After construction ends and before occupancy, but under ventilation conditions typical for occupancy, conduct IAQ testing using protocols consistent with the methods in the table below for all occupied spaces.
- C. Use current versions of ASTM standard methods, EPA compendium methods, or ISO methods, as indicated.
- D. Conduct all measurements before occupancy during normal occupied hours, with the building ventilation system started at the normal daily start time and operated at the minimum outdoor airflow rate for the occupied mode throughout the test. F
- E. or each sampling point where the concentrations exceed the limit, take corrective action and retest for the noncompliant contaminants at the same sample points. Repeat until all requirements are met.

Test for the particulate matter (PM) and inorganic gases listed in Table 1, using an allowed test method, and demonstrate the contaminants do not exceed the concentration limits listed in the table.



**Table 1.**

<b>Contaminant (CAS#)</b>	<b>Concentration Limit (µg/m3)</b>	<b>Allowed Test Methods</b>
Carbon monoxide (CO)	9 ppm; no more than 2 ppm above outdoor levels	ISO 4224 EPA Compendium Method IP-3 GB/T 18883-2002 for projects in China  Direct calibrated electrochemical instrument with accuracy of (+/- 2% ppm <50 ppm minimum accuracy).
PM 10	ISO 14644-1:2015, cleanroom class of 8 or lower 50 µg/m3 Healthcare only: 20 µg/m3	Particulate monitoring device with accuracy greater of 5 micrograms/m3 or 20% of reading and resolution (5 min average data) +/- 5 µg/m3
PM 2.5	12 µg/m3 or 35 µg/m3**	
Ozone	0.07 ppm	Monitoring device with accuracy greater of 5 ppb or 20% of reading and resolution (5 min average data) +/- 5 ppb  ISO 13964 ASTM D5149 — 02 EPA designated methods for Ozone

Perform a screening test for Total Volatile Organic Compounds (TVOC). Use ISO 16000-6, EPA TO-17, or EPA TO-15 to collect and analyze the air sample. Calculate the TVOC value per EN 16516:2017, CDPH Standard Method v1.2 2017 section 3.9.4, or alternative calculation method as long as full method description is included in test report. If the TVOC levels exceed 500 µg/m3, investigate for potential issues by comparing the individual VOC levels from the GC/MS results to associated cognizant authority health-based limits. Correct any identified issues and re-test if necessary.

Additionally, test for the individual volatile organic compounds listed in Table 2 using an allowed test method and demonstrate the contaminants do not exceed the concentration limits listed in the table.



**Table 2.**

<b>Contaminant (CAS#)</b>	<b>Concentration Limit (µg/m3)</b>	<b>Allowed Test Methods</b>
Formaldehyde 50-00-0	20 µg/m3 (16 ppb)	ISO 16000-3, 4; EPA TO-11a, EPA comp. IP-6A,ASTM D5197-16
Acetaldehyde 75-07-0	140 µg/m3	
Benzene 71-43-2	3 µg/m3	ISO 16000-6 EPA IP-1, EPA TO-17, EPA TO-15 ISO 16017-1, 2; ASTM D6196-15
Hexane (n-) 110-54-3	7000 µg/m3	
Naphthalene 91-20-3	9 µg/m3	
Phenol 108-95-2	200 µg/m3	
Styrene 100-42-5	900 µg/m3	
Tetrachloroethylene 127-18-4	35 µg/m3	
Toluene 108-88-3	300 µg/m3	
Vinyl acetate 108-05-4	200 µg/m3	
Dichlorobenzene (1,4-) 106-46-7	800 µg/m3	
Xylenes-total 108-38-3, 95-47-6, and 106-42-3	700 µg/m3	

- F. Draft IAQ Management Plan Review Meeting: Once the Owner and Architect have reviewed the Draft IAQ Management Plan and prior to construction at the site, schedule and conduct a meeting to review the Draft IAQ Management Plan and discuss procedures, schedules and specific requirements for IAQ during the construction and pre-construction phases of the building. Discuss coordination and interface between the Contractor and other construction activities. Identify and resolve problems with compliance to the requirements. Record minutes of the meeting, identify all conclusions reached and matters requiring further resolution.
  - 1. Attendees: The Contractor and related Contractor personnel associated with the work of this section, including personnel to be in charge of the IAQ management program, Architect, Owner and such additional personnel as the Architect or Owner deems appropriate.
- G. Final IAQ Management Plan: Make any revisions to the Draft IAQ Management Plan agreed upon during the meeting identified in item (B) above and incorporate resolutions agreed to be made subsequent to the meeting. Submit the revised plan to the Owner and Architect for approval within 10 calendar days of the meeting.

**3.2 IMPLEMENTATION OF IAQ MANAGEMENT PLAN**

- A. Manager: The Contractor shall designate an on-site party (or parties) responsible for instructing workers and overseeing and the IAQ Management Plan for the Project.
- B. Progress Meetings: Construction related IAQ procedures shall be included in the pre-construction and construction progress meeting agendas.
- C. Distribution: The Contractor shall distribute copies of the IAQ Management Plan to the Job Site Foreman, each Subcontractor, the Owner, and the Architect.
- D. Instruction: The Contractor shall provide on-site instruction of the IAQ procedures and ensure that all participants in the construction process understand the importance of the goals of the IAQ Management Plan.

END OF SECTION 01 51 00





SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for the following:
  - 1. Recycling nonhazardous construction waste.
  - 2. Disposing of nonhazardous construction waste.
- B. Related Sections include the following:
  - 1. See any relevant Division 1 Sections provided by DDC such as "Temporary Facilities and Controls" for environmental-protection measures during construction, and location of waste containers at Project site.
  - 2. Section 01 81 13 Sustainable Design Requirements

1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- C. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

1.4 PERFORMANCE GOALS

- A. General: Develop waste management plan that results in end-of-Project rates for recycling of 75 percent by weight of total waste generated by the Work.
- B. Recycle Goals: Owner's goal is to salvage and recycle as much nonhazardous construction waste as possible. Owner has established minimum goals for the following materials:



1. Demolition Waste:

- a. Asphaltic concrete paving.
- b. Concrete.
- c. Concrete reinforcing steel.
- d. Electrical conduit.
- e. Copper wiring.
- f. Lighting fixtures.
- g. Lamps.
- h. Ballasts.
- i. Electrical devices.

2. Construction Waste:

- a. Site-clearing waste.
- b. Masonry and CMU.
- c. Lumber.
- d. Wood sheet materials.
- e. Wood trim.
- f. Metals.
- g. Roofing.
- h. Insulation.
- i. Carpet and pad.
- j. Gypsum board.
- k. Piping.
- l. Electrical conduit.
- m. Packaging: Regardless of salvage/recycle goal indicated above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
  - 1) Paper.
  - 2) Cardboard.
  - 3) Boxes.
  - 4) Plastic sheet and film.
  - 5) Polystyrene packaging.
  - 6) Wood crates.
  - 7) Plastic pails.

1.5 ACTION SUBMITTALS

- A. Waste Management Plan: Submit 3 copies of plan within 30 days of date established for commencement of the Work.

1.6 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include the following information:

- 1. Material category.



2. Generation point of waste.
3. Total quantity of waste in tons.
4. Quantity of waste recycled, both estimated and actual in tons.
5. Total quantity of waste recovered (recycled) in tons.
6. Total quantity of waste recovered (recycled) as a percentage of total waste.
7. A sample report is attached at the end of this section.

- B. Final Waste Reduction Report that details all major waste streams generated, including disposal and diversion rates.
- C. Waste Reduction Calculations: Before request for Substantial Completion, submit three copies of calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- D. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- E. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- F. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- G. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

## 1.7 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Waste Management Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:
  1. Review and discuss waste management plan including responsibilities of Waste Management Coordinator.
  2. Review requirements for documenting quantities of each type of waste and its disposition.
  3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
  4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
  5. Review waste management requirements for each trade.
- C. Commingled waste shall be reported with Project specific diversion rates.



## 1.8 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification (at least 5 materials, structural and nonstructural), waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of construction waste generated by the Work. Include estimated quantities and assumptions for estimates. Identify at minimum five materials (both structural and nonstructural) targeted for diversion. Approximate the overall project waste that these materials represent.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
  - 1. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
  - 2. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
  - 3. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.
  - 4. NOTE: Land clearing debris, excavated soil, an alternative daily cover are excluded from waste diversion goals.
- D. Specify whether materials will be source separated or commingled

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 PLAN IMPLEMENTATION

- A. General: Implement waste management plan as approved by Architect. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
  - 1. Comply with Division 01 Section "Temporary Facilities and Controls" for operation, termination, and removal requirements.
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project. Superintendent may be the waste management coordinator.



- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
  - 1. Distribute waste management plan to everyone concerned within three days of submittal return.
  - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
  - 2. Comply with Division 01 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

### 3.2 RECYCLING CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Owner.
- C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.
  - 1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
    - a. Inspect containers and bins for contamination and remove contaminated materials if found.
  - 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  - 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
  - 4. Store components off the ground and protect from the weather.
  - 5. Remove recyclable waste off Owner's property and transport to recycling receiver or processor.
- D. Divert from landfill at a minimum 75% of construction and demolition waste, from at least four different material streams.

### 3.3 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
  - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
  - 2. Polystyrene Packaging: Separate and bag materials.



3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Site-Clearing Wastes: Chip brush, branches, and trees on-site or at landfill facility.

1. Comply with requirements in Division 32 Section "Plants" for use of chipped organic waste as organic mulch.

C. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

D. Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location.

### 3.4 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION 01 74 19

SECTION 01 81 13  
SUSTAINABLE DESIGN REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes administrative requirements and procedures for compliance and documentation for the Queens Community Center to obtain minimum LEED Gold for Building Design and Construction for (LEED-BD+C) certification under the US Green Building Council's LEED-Core and Shell v4 & LEED Core and Shell v4.1 (where indicated) rating system.
- B. Related Sections:
  - 1. Included in Outline Specification Submittal:
    - i. Section 017419 - CONSTRUCTION WASTE MANAGEMENT
    - ii. Section 015 100 – CONSTRUCTION INDOOR AIR QUALITY
    - iii. Section 019119 – GENERAL COMMISSIONING REQUIREMENTS
    - iv. Divisions 03 through 12, 31, and 32 Sections: Specific requirements for materials in those Sections.
  - 2. Related Sections anticipated in Division 1 specifications to be provided by DDC:
    - i. SUBMITTAL PROCEDURES
    - ii. GENERAL COMMISSIONING REQUIREMENTS

1.2 DEFINITIONS

- A. United States Green Building Council (USGBC): A non-profit group of leaders from every sector of the building industry working to promote buildings that are environmentally responsible, profitable and healthy places to live and work. The USGBC is administrator of the LEED Green Building Rating Systems.
- B. Leadership in Energy & Environmental Design (LEED): A green building rating system that provides independent third party verification of a project's sustainability.
- C. Indoor Air Quality (IAQ) Management Plan: Plan developed by the contractor to provide a healthy and safe indoor environment for workers during construction as well as the building's current and eventual occupants. The IAQ Management Plan must meet or exceed the recommendations of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd edition, 2007, ANSI/SMACNA 008–2008, Chapter 3.
- D. Material Cost: The dollar value of materials being provided to the site, after any contractor mark-ups, inclusive of all transportation and tax fees but excluding equipment and labor costs.
- E. Environmental Product Declaration (EPD): An independently verified report based on life-cycle assessment studies that have been conducted according to a set of common rules for each product category and then peer-reviewed.



- F. Cradle to Gate Assessment: Analysis of a product's partial life cycle, from resource extraction (cradle) to the factory gate (before it is transported for distribution and sale). It omits the use and the disposal phases of the product.
- G. Cradle to Grave: Analysis of a product's full life cycle, from resource extraction (cradle) to the disposal phase (grave).
- H. Life Cycle Assessment: An evaluation of the environmental effects of a product from cradle to grave, as defined by ISO 14040-2006 and ISO 14044-2006.
- I. Third-party Verified Corporate Sustainability Reports (CSR): A report that outlines the environmental impacts of extraction operations and activities associated with the manufacturer's product and the product's supply chain. Corporate sustainability reports must be in line with one of the following: Global Reporting Initiative (GRI) Sustainability Report, Organization for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises, U.N. Global Compact, and ISO 26000.
- J. Extended Producer Responsibility (EPR): Products whose manufacturer has established measures to reclaim its products at the end of their useful life and to recycle them into the same product.
- K. Product Category Rules: A set of rules, requirements, and guidelines for developing Environmental Product Declarations.
- L. Program Operator: An organization that ensures EPDs meet the product category rules (PCRs) for the associated product category. The program operator doesn't do the actual life-cycle assessments. UL Environment is the leading program operator in the United States.
- M. Product-Specific Environmental Product Declaration (EPD): A product with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that has at least a cradle to gate scope.
- N. Product-Specific Type III Environmental Product Declaration (EPD): A product with a with third-party certification, including external verification, in which the manufacturer is explicitly recognized by the program operator. The product specific Environmental Product Declaration shall conform to ISO 14025, ISO 14040, ISO 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.
- O. Industry-wide Environmental Product Declaration (EPD): A product with a with third-party certification, including external verification, in which the manufacturer is explicitly recognized by the program operator. The industry-wide Environmental Product Declaration shall conform to ISO 14025, ISO 14040, ISO 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope. Also referred to as a "generic" Environmental Product Declaration.
- P. Bio-based Materials: A product that meets the Sustainable Agriculture Network's Sustainable Agriculture Standard. Bio-based raw materials shall be tested using ASTM Test Method D6866 and be legally harvested, as defined by the exporting and receiving country.
- Q. Composite Wood and Agrifiber: Products such as particleboard, medium density fiberboard (MDF), plywood, wheatboard, strawboard, panel substrates, and door cores that are a composite of wood and/or plant material pressed and adhered together.
- R. Chain of Custody (COC): Certificates signed by manufacturers certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC





STD-01-001, "FSC Principles and Criteria for Forest Stewardship." Certificates shall include evidence that manufacturer and supplier are certified for chain of custody by an FSC-accredited certification body.

- S. Recycled Content: The percentage by weight of a material's constituents that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (pre-consumer), or after consumer use (post-consumer).
  - a. Spills and scraps from the original manufacturing process that are combined with other constituents after a minimal amount of reprocessing for use in further production of the same product are not recycled materials.
  - b. Discarded materials from one manufacturing process that are used as constituents in another manufacturing process are pre-consumer or post industrial recycled materials.
  - c. Recycled content of materials shall be defined in accordance with the International Organization for Standardization document, ISO 14021-1999 – Environmental labels and declarations – self declared environmental claims (Type II environmental labeling). [www.iso.org](http://www.iso.org)
- T. Pre-consumer Recycled Content: Matter diverted from the waste stream during the manufacturing process, determine as the percentage of material, by weight.
- U. Post-consumer Recycled Content: Waste generated by households or commercial, industrial, and institutional facilities in their role as end users of a product that can no longer be used for its intended purpose.
- V. Regionally Extracted, Processed and Manufactured Materials: Materials that are extracted, harvested, or recovered; processed; and manufactured within a radius of 100 miles (160 km) from the Project location. Manufacturing refers to the final assembly of components into the building product that is installed at the Project site.
- W. Health Product Declaration: A standard format for reporting product content and associated health information for building products and materials.
- X. GreenScreen® for Safer Chemicals: A method for comparative chemical hazard assessment and their potential effect on human health and the environment.
- Y. Volatile Organic Compound (VOC): Carbon compounds considered indoor air contaminants that are odorous, irritating, and/or harmful to the comfort and wellbeing of installers and occupants.
- Z. Wet Products: Materials and products installed in wet form, including paints, sealants, adhesives, and special coatings.

### 1.3 PROJECT GOALS

- A. The proposed project is designed to be sustainable, with the intent of incorporating the following qualities:
  - 1. The project will minimize its effect on the environment by selecting environmentally friendly building materials and utilizing sustainable construction practices.
  - 2. The project will provide a healthy and comfortable space for its occupants by developing and following an Indoor Air Quality Management Plan during construction, by selecting only non-toxic and low-emitting materials, and by designing the building's systems to provide tenants with exceptional indoor air quality.



3. The finished project will consume significantly less energy and water than a typical code-compliant building through the use of premium efficiency equipment and designing efficient building systems.
- B. The proposed project is targeting a minimum GOLD from the US Green Building Council's (USGBC) Leadership in Energy and Environmental Design Building Design and Construction (LEED-BD+C) version 4.0 and version 4.1 (where indicated) Green Building Rating System. The following are expected of all contractors and sub-contractors:
  1. Comply with LEED-NC version 4.0 and 4.1 (where indicated) requirements for those credits being targeted.
  2. Refer to LEED Scorecard that follows this Section.
  3. Refer to individual Specification Sections for additional requirements.

#### 1.4 MEETINGS

- A. Prime Contractor shall conduct LEED Certification meetings at 25%, 50% and 100% construction completion, in addition to those meetings outlined in Section 013100 Project Management and Coordination.
  1. The meetings shall include, at a minimum:
    - a. Prime Contractor's Project Manager
    - b. Owner's Representative
    - c. Prime Contractor's LEED Representative
    - d. All other attendees designated by Owner's Representative
    - e. Sub-Contractor Representatives as appropriate to stage of work
  2. At a minimum, LEED certification goals and issues shall be discussed at the following meetings:
    - a. Preconstruction Meetings
    - b. Progress Meetings
    - c. Subcontractor Meetings
    - d. LEED Certification Meetings (outlined above). Meeting should be scheduled as a part of regularly scheduled job meetings on site.

#### 1.5 SUBMITTAL REQUIREMENTS

- A. Coordination of Submittals: Coordinate LEED submittals with general submittal requirements as indicated in Section 013300 – SUBMITTAL PROCEDURES.
- B. LEED Action Plans: Provide preliminary hard copy submittals within 14 days of date established for commencement of the Work indicating how the following requirements will be met.
  1. Materials & Resources Prerequisite and Credit: Construction and Demolition Waste Management complying with Division 01 Section "Construction Waste Management."
  2. Materials & Resources Credit: Building product disclosure and optimization – sourcing of raw materials: list of proposed materials with recycled content, proposed regionally extracted, processed and manufactured materials, and proposed FSC-certified wood products
  3. Indoor Environmental Quality Credit: Construction Indoor Air Quality Management Plan: submit a draft copy of the plan for review, complying with Section 015100 – Construction Indoor Air Quality



- C. Contractor is responsible for completion and transmittal of ALL construction-related tracking required for LEED certification including:
1. LEED Submittal Coversheets: All project submittals must be accompanied by a completed LEED coversheet. Submittal packages must also include documentation in support of the sustainability claims made on the LEED coversheet, including:
    2. Cost of each material or product, excluding labor and equipment
    3. From manufacturer, for each product's environmental attributes. The team's sustainability consultant will be responsible for obtaining a report describing raw materials suppliers, complete content inventory for the product, and/or environmental product declaration.
    4. Highlight compliance with all requirements for low-emitting materials as noted in Section 2 (Products)
    5. Providing and following an Erosion and Sedimentation Control Plan. See Section 312500 – Erosion and Sedimentation Control Plan.
    6. Providing and following a Construction Waste Management Plan and ongoing documentation of construction and demolition waste recycling / salvage rates for all categories of waste. See Section 017419 - Construction Waste Management.
    7. During construction, meet or exceed all applicable recommended control measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd edition, 2007, ANSI/SMACNA 008–2008, Chapter See Section 015100 – Construction Indoor Air Quality
    8. Providing monthly tracking and progress updates on the following credits. The sustainability consultant will be responsible for final documentation for submission to the Green Business Certification Inc (GBCI).
      1. Materials & Resources Prerequisite and Credit: Construction and Demolition Waste Management
      2. Materials & Resources Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials
      3. Indoor Environmental Quality Credit: Low Emitting Interiors
      4. Indoor Environmental Quality Credit: Construction IAQ Management Plan
      5. Indoor Environmental Quality Credit: Indoor Air Quality Assessment
    9. Contractor to maintain Materials Credit Tracking Sheet monitoring the project's progress towards targeted LEED Materials and Resources Credits. Tracking Sheet to be presented at construction meetings.
    10. Contractor to maintain a Low Emitting Materials Tracking Sheet monitoring the project's progress towards targeted LEED Indoor Environmental Quality Credits. Tracking Sheet to be presented at construction meetings.
    11. Contractor to package each submittal individually using a LEED Transmittal Cover Sheet verifying that submittals comply with LEED Requirements and that appropriate documentation is included. See sample provided.



12. Project Materials Cost Data: Provide itemized and total cost for ALL building materials under Divisions 2-10, 12, 31, and 32 used for Project, excluding labor and equipment.
13. Contractor to provide Commissioning Authority with a copy of approved submittals for all equipment to be commissioned as well as documentation requested by the Commissioning Authority which is necessary for the commissioning process. This may include: detailed manufacturer installation and start-up, operating, troubleshooting and maintenance procedures, full details of any owner-contracted tests, fan and pump curves, full factory testing reports, if any, and full warranty information including all responsibilities of the Owner to keep the warranty in force clearly identified. The actual field checkout sheet forms to be used by the factory or field technicians shall be provided to the Commissioning Authority.

#### 1.6 SPECIAL PRODUCTS AND SUBSTITUTION PROCEDURES

- A. In addition to the requirements of Section 012500 – Substitution Procedures, the special substitution requirements described here apply only to the LEED certification related materials and requirements and environmental products and procedures identified in this Section.
- B. Notify Owner and Architect when contractor wishes to substitute materials, equipment, or products that meet the aesthetic and programmatic intent of the Construction Documents and offer equivalent or increased environmental sensitivity to materials, equipment, or products specified to meet LEED requirements as indicated in the Construction Documents.
- C. Substitutions that may affect LEED certification must be clearly stated as such.
- D. Comply with the requirements of Section 012500 – Substitution Procedures, except as follows:
  1. Prior to submitting detailed information required under Section 012500 – Substitution Procedures, submit the following for initial review by the architect.
    - a. Product data including manufacturer's names, address, and phone number.
    - b. Include copy of Material Safety Data Sheet (MSDS) if applicable.
    - c. Description of the differences of the proposed substitution from specified product related to LEED requirements. Include description of environmental advantages of proposed substitution over specified product.
    - d. The contractor is responsible for re-submittal of all calculations, and documentation of products or material substitutions that affect LEED prerequisites and credits referenced in this Section, and any credits previously submitted as part of the project's LEED Design Application Submittal, and all credits included in the LEED Construction Submittal. Products that do not meet these requirements should not be submitted for substitution.
    - e. Substitutions of materials and products specified as part of the Contract documents in the following areas (but not necessarily limited to these items) will require review and potential re-submittal of LEED Design Credit Application Pre-requisites and Credits:
      - i. Irrigation System
      - ii. Rainwater Management System
      - iii. Roofing products and materials
      - iv. Plumbing fixtures and controls
      - v. Interior and Exterior Lighting systems and controls
      - vi. HVAC equipment, systems and controls
      - vii. CO<sub>2</sub> monitoring system
      - viii. Acoustical Performance



- f. Substituted products shall not be ordered or installed without written acceptance by the owner.
- 2. Requests for Substitutions
  - a. Submit a Submit a separate request for each LEED related product substitution.
  - b. Identify product by Specification Section and LEED credit or credits, if applicable.
  - c. List similar projects using product, dates of installation, and names of Contractor and Owner.
  - d. Give itemized comparison of proposed substitution with specified product, listing variations, and reference Specification section and Article number.
  - e. Include copy of Material Safety Data Sheet (MSDS) if applicable.
  - f. Give cost data comparing proposed substitution with specified product and amount of net change to Contract Sum. The cost data should be based on life cycle analysis for each affected product including annual energy consumption and maintenance costs.
  - g. State effect of substitution on construction schedule and changes required in other work of products.

#### 1.7 LEED DOCUMENTATION SUBMITTALS

- A. For all credits: LEED documentation submittals must be prepared and submitted using the LEED-Online Credit web based application (<https://www.usgbc.org/leedonline/>) and minimum system requirements.
- A. Once the Contractor has joined the project through LEED-Online, the LEED Project Administrator will assign the LEED credits that the contractor is responsible for completing.
  - a. NOTE: LEED Online is only accessible through Safari, Internet Explorer and Firefox at this time.
  - b. NOTE: Each "Credit Form" is an editable Adobe pdf document. It may be completed or updated at any time prior to the LEED Construction Submittal. After you have completed documenting the credit, use the 'Save' button at the lower right hand corner of the Form to save the data online.
  - c. Additional submittal documentation and back-up requirements should be uploaded to the "File Uploads" section of LEED-Online following the required documentation support for each credit.
- B. Sustainable Sites Prerequisite Construction Activity Pollution Prevention. Using the LEED Online Credit form, provide:
  - a. A narrative describing the implemented erosion and sedimentation control measures and how these were maintained
  - b. Photographic evidence of the implemented measures from various stages throughout construction.
- C. Water Efficiency Prerequisite and Credit Water Metering and Energy & Atmosphere Prerequisite and Credit Energy Metering: Product Data and wiring diagrams for sensors and data collection system used to provide continuous metering of building energy and water consumption performance over time.
- D. Materials & Resources Prerequisite and Credit: Construction and Demolition Waste Management: Comply with Division 01 Section "Construction Waste Management." Using the LEED Construction and Demolition Waste Calculator and the LEED Credit Form:



- a. Complete the construction waste calculation tables including: General description of each type/category of waste generated; location of receiving agent (recycler/landfill) for waste; quantity of waste diverted (by category) in tons or cubic yards.
  - b. Provide a narrative describing the project's construction waste management approach including a copy of the project's construction waste management plan. Please provide any additional comments or notes to describe special circumstances or considerations regarding the project's credit approach.
  - c. Provide the Construction Waste Management Plan.
  - d. Provide the hauling/recycling tags/tickets or receipts from the project
  - e. Provide project-specific documentation of recycling rate for commingled facilities
- E. Materials & Resources Credit: Building Product Disclosure and Optimization –Environmental Product Declaration- EPDs - Environmental Product Declarations Using the LEED Building Product Disclosure and Optimization Calculator and the LEED Online Credit Form:
- a. Provide a list of manufactures providing EPDs.
  - b. Provide a list of each separate product holding an EPD.
  - c. Provide copy of each EPD including statement type for each EPD.
- F. Materials & Resources Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials, Leadership Extraction Practices - Recycled Content Using the LEED Building Product Disclosure and Optimization Calculator and the LEED Online Credit Form:
- a. Provide the total project materials cost per "Project Materials Cost Data" in the Submittals section above.
  - b. Provide a tabulation of each material used on the project that is being tracked for recycled content. The tabulation must include a description of the material, the manufacturer of the material, the product cost, the pre-consumer and/or post-consumer recycled content percentage, and the source of the recycled content data.
  - c. Provide a tabulation of each material used on the project that is being tracked for regional content. The tabulation must include a description of the material; the manufacturer of the material; the product cost; the percentage of the product by weight that meets both the extraction and manufacturer location criteria; distance between the project site and extraction/harvest/recovery site; and distance between the project site and final manufacturing location.
  - d. Provide Manufacturer cut sheets, literature, or letters highlighting the overall post-consumer and/or post-industrial recycled content percentages (by weight) of each listed product
  - e. Provide Manufacturer cut sheets, literature, or letters highlighting address location of each material's extraction/harvest/recovery and manufacturing / processing sites AND a map (Yahoo Maps, Google Maps or equivalent) indicating distances from each location to the project site.
- G. Materials & Resources Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials, Leadership Extraction Practices - FSC Certified Wood Products. Using the LEED Building Product Disclosure and Optimization Calculator and the LEED Online Credit Form:
- a. Provide total of all new, permanently installed wood-based construction materials cost per "Project Materials Cost Data" in the Submittals section above.
  - b. Provide a list of items (and/or components of products) claimed as FSC-certified, including product type, manufacturer, and the entity's Chain of Custody (COC) certification number. (Each product name can then be cross-referenced with the manufacturer or vendor COC number during the LEED certification review.) Visit [www.fscus.org/green\\_building](http://www.fscus.org/green_building) for more information.
  - c. Provide official proof of FSC Chain of Custody certification of all fabricators including, but not limited to, millworkers and cabinet-makers, who modify or alter the FSC wood products before they are installed in the project.



- d. Provide materials invoices (showing costs) for each listed product
- H. Materials & Resources Credit: Building Product Disclosure and Optimization – Material Ingredients- Material Ingredient Reporting- Material Ingredient Reporting Using the LEED Building Product Disclosure and Optimization Calculator and the LEED Online Credit Form:
- a. Provide a list of manufactures providing material ingredient reporting.
  - b. Provide a list of each separate product providing material ingredient reporting.
  - c. Provide copy of each material reporting statement including: Health Product Declaration, Cradle to Cradle Declare, ANSI/BIFMA e3 Furniture Sustainability Standard, Cradle to Cradle Material Health Certificate, or other USGBC approved program.
- I. Indoor Environmental Quality Credit low-Emitting Materials. Using the LEED Low Emitting Calculator and LEED Online Credit Form, provide the following:
- a. A listing of each interior applied paints and coating. Include the manufacture’s name, product name, specific VOC data (in g/L less water) for each product, and the corresponding allowable VOC from the referenced standard: California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario, VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective February 5, 2016. Include cut sheets, MSDS, or other manufacturer’s data confirming compliance with the VOC limits.
  - b. A listing of each indoor adhesive, sealant and sealant primer product used on the project. Include the manufacture’s name, product name, specific VOC data (in g/L less water) for each product, and the corresponding allowable VOC from the referenced standard, California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario, or SCAQMD Rule 1168, October 6, 2017. Include cut sheets, MSDS, or other manufacturer’s data confirming compliance with the VOC limits.
  - c. A listing of each composite wood and agrifiber product installed in the building interior, including those manufactured off-site, such as toilet partitions, backer board, door cores and engineered wood, including manufacture’s name and product name. Confirm that the product meets the low formaldehyde emissions that meet the EPA TSCA Title VI or California Air Resources Board ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde resins. Include cut sheets or manufacturer literature or letters indicating the bonding agents for each composite wood and agrifiber material used in the project, showing that no added urea-formaldehyde resins were used in these products or meets ULEF criteria.
  - d. A listing of each structural composite wood installed in the building interior, such as plywood, oriented-strand board, structural composite lumber, glued laminated timber, i-joists, cross-laminated timber, and finger-jointed lumber, including manufacture’s name and product name. Confirm that the product meets. Confirm that wood products are made with moisture resistant adhesives meeting ASTM 2559, have no surface treatments with added urea-formaldehyde resins or coatings, and are certified according to the applicable industry standard. Include cut sheets or manufacturer literature or letters indicating the bonding agents for each composite wood and agrifiber material used in the project, showing compliance with the applicable industry standard:
    - i. Plywood: compliant in accordance with Voluntary Product Standard - Structural Plywood (PS 1-09), Voluntary Product Standard – Performance Standard for Wood-Based Structural-Use Panels (PS 2-10), or one of the standards considered by CARB to be equivalent to PS 1 or PS 2: (AS/NZS 2269, EN 636 3S (including CE label), Canadian
    - ii. Standards Association CSA O121 for Douglas fir plywood, CSA O151 for Canadian softwood plywood, for CSA O153 Poplar plywood, or CSAO325 for Construction sheathing)



- iii. Oriented strand board: specified with the Exposure 1 or Exterior bond classification in accordance with Voluntary Product Standard – Performance Standard for Wood-Based Structural-Use Panels (PS 2-10)
  - iv. Structural composite lumber: compliant in accordance with Standard Specification for Evaluation of Structural Composite Lumber Products (ASTM D 5456-13)
  - v. Glued laminated timber: compliant in accordance with Structural Glued Laminated Timber (ANSI A190.1-2012)
  - vi. I-joists compliant in accordance with Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists (ASTM D 5055-13)
  - vii. Cross-laminated timber: compliant in accordance with Standard for Performance-Rated Cross-Laminated Timber (PRG 320-15)
  - viii. Finger-jointed lumber labeled “Heat Resistant Adhesive (HRA)” in accordance with the American Softwood Lumber Standard (DOC PS-20 2015)
- e. A listing of flooring installed in the project. Include manufacturer’s documentation confirming that the product has been tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario.
  - f. A listing of ceiling products, including ceiling panels, ceiling tile, surface ceiling structures such as gypsum or plaster, suspended systems, and glazed skylights, installed in the project. Include manufacturer’s documentation confirming that the product has been tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario.
  - g. A listing of insulation, including thermal and acoustic boards, batts, rolls, blankets, sound attention fire blankets, foamed-in place, loose-fill, blown, and sprayed insulation, installed in the project. Include manufacturer’s documentation confirming that the product has been tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.2-2017, using the applicable exposure scenario.
- J. Indoor Environmental Quality Credit Construction IAQ Management Plan. Provide the following:
- a. A copy of the project’s Indoor Air Quality Management Plan, highlighting the no-smoking policy
  - b. Confirm if the permanently installed air handling equipment was used during construction.
  - c. Six photographs at each of three different times during the construction period to highlight the implemented construction IAQ practices.
  - d. List all filtration media (manufacturer, model number, MERV rating, location of installed filter) installed during construction and confirm that each unit was replaced prior to occupancy.
  - e. A narrative describing protection measures for absorbent materials
- K. Indoor Air Quality Assessment: Provide the following:
- a. A Flush-out Report documenting the required volume and duration of the flush-out and describing the project’s specific flush-out procedures, with product data for filtration media used during flush-out and during occupancy.
- OR**
- b. A copy of the Air Testing Report documenting the procedures for air testing, the locations, dates and results of each test.

## PART 2 PRODUCTS





## 2.1 SUSTAINABLE MATERIALS

- A. Environmental Product Declarations: Provide at least 20 (after weighting) separate permanently installed products from at least five different manufacturers that met one of the criteria below.
- a. Products with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that have at least a cradle to gate scope are valued as one whole product for the purposes of credit achievement calculation.
  - b. Product-specific Type III EPD -- Internally Reviewed. Products with an internally critically reviewed LCA in accordance with ISO 14071. Products with product-specific internal EPDs which conform to ISO 14025, and EN 15804 or ISO 21930 and have at least a cradle to gate scope are valued as one whole product for the purposes of credit achievement calculation.
  - c. Industry-wide Type III EPD -- Products with third-party certification (Type III), including external verification, in which the manufacturer is explicitly recognized as a participant by the program operator. Products with industry-wide EPDs, which conform to ISO 14025, and EN 15804 or ISO 21930 and have at least a cradle to gate scope are valued as one whole product for purposes of credit achievement calculation.
  - d. Environmental Product Declarations which conform to ISO 14025 and EN 15804 or ISO 21930 and have at least a cradle to gate scope.
    - i. Product-specific Type III EPD -- Products with third-party certification (Type III), including external verification and external critical review in which the manufacturer is explicitly recognized as the participant by the program operator are valued as 1.5 products for the purposes of credit achievement calculation.
- B. Environmental Product Declarations - Multi-Attribute Optimization: Use products that comply with one of the criteria below for 10%, by cost, of the total value of permanently installed products in the project, or use at least 10 permanently installed products sourced from at least three different manufacturers. Products will be valued as below.
- a. Life Cycle Impact Reduction Action Plan (value at 50% by cost or ½ product)
    - i. The manufacturer has produced a product specific LCA using EN 15804 or ISO 21930 for the product and has provided a publicly available action plan to mitigate or reduce life cycle impacts. The action plan must be product-specific using the specified PCR functional unit, be critically reviewed, and must include the following information:
      1. Description of the LCA conducted including the dataset, software or platform used by manufacturer to complete the analysis.
      2. Identification of the largest life cycle impact areas identified in the analysis and a narrative description of the impact areas targeted for reduction in the action plan.
      3. Description of specific steps anticipated in implementation of the action plan. Include proposed changes in formulation or manufacturing processes that are planned as part of impact reduction strategy.
      4. Specific dates and a full timeline for completion of all the steps described in the action plan.
  - b. Life Cycle Impact Reductions in Embodied Carbon.
    - i. Products that have demonstrated environmental impact reductions for the specified functional unit based on a current third-party EPD or verified LCA that conforms to the comparability requirements of ISO 14025 and ISO 21930.
      1. The comparative analysis must show impact reduction in the global warming potential (GWP) impact category and must include a narrative describing how reductions in impacts were achieved. The published comparisons must be third-party verified (value at 100% by cost or 1 product).
      2. The comparative analysis must show impact reduction(s) of at least 10% in the global warming potential (GWP) impact category and must include a narrative



- describing how the impact reductions were achieved. The published comparisons must be third-party verified (value at 150% by cost or 1.5 products).
3. The comparative analysis must show impact reduction(s) of at least 20% in the global warming potential (GWP) impact category, and demonstrate at least 5% reduction in two additional impact categories. A narrative describing how the impact reductions were achieved is required. The published comparisons must be third-party verified (value at 200% by cost or 2 products).
- c.
- C. Leadership extraction practices: Provide products which meet at least one of the responsible extraction criteria below for at least 20%, by cost, of the total value of permanently installed building products in the project. Products sourced (extracted, harvested, manufactured, and purchased) within 100 miles (160 km) of the project site are valued at 200% of their cost.
- a. Bio-based materials. Bio-based products shall meet the Sustainable Agriculture Network's Sustainable Agriculture Standard. Bio-based raw materials shall be tested using ASTM Test Method D6866 and be legally harvested, as defined by the exporting and receiving country. Exclude hide products, such as leather and other animal skin material.
  - b. New wood products. Wood products shall be certified by the Forest Stewardship Council or USGBC-approved equivalent.
  - c. Materials reuse. Reuse includes salvaged, refurbished, or reused products.
  - d. Recycled content. Recycled content is the sum of postconsumer recycled content plus one-half the pre-consumer recycled content, based on cost.
  - e. Extended producer responsibility (ie Cradle to Cradle Certified Products) Products purchased from a manufacturer (producer) that participates in an extended producer responsibility program or is directly responsible for extended producer responsibility. Products meeting extended producer responsibility criteria are valued at 50% of their cost for the purposes of credit achievement calculation.
- D. Heath Product Declarations: Provide at least 20 (after weighting) separate permanently installed products from at least five different manufacturers that met one of the criteria below and demonstrate the chemical inventory of the product to at least 0.1% (1000 ppm).
- a. Manufacturer Inventory. The manufacturer has published complete content inventory for the product following these guidelines:
    - i. A publicly available inventory of all ingredients identified by name and Chemical Abstract Service Registration Number (CASRN) and/or European Community Number (EC Number).
    - ii. Materials defined as trade secret or intellectual property may withhold the name and/or CASRN/EC Number but must disclose ingredient/chemical role, amount and hazard score/class using either:
      1. Greenscreen List Translator (LT) score and/or Full GreenScreen Benchmark (BM)
      2. The Globally Harmonized System of Classification and Labeling of Chemicals rev.6 (2015) (GHS)



- a. The hazard screen must be applied to each trade secret ingredient and the inventory lists the hazard category for each of the health hazards included in Part 3 of GHS (e.g. "GHS Category 2 Carcinogen").
  - b. Health Product Declaration. The end use product has a published and complete Health Product Declaration with full disclosure of known hazards in compliance with the Health Product Declaration open Standard.
  - c. Cradle to Cradle. Product has Material Health Certificate or is Cradle to Cradle Certified™ under standard version 3 or later with a Material Health achievement level at the Bronze level or higher.
  - d. Declare. The Declare product label meet the following requirements:
    - i. Declare labels designated as Red List Free or Declared.
    - ii. Declare labels designated as LBC Compliant that demonstrate content inventory to 0.1% (1000 ppm).
  - e. ANSI/BIFMA e3 Furniture Sustainability Standard. The documentation from the assessor or scorecard from BIFMA must demonstrate the product earned at least 3 points under 7.5.1.3 Advanced Level in e3-2014 or 3 points under 7.4.1.3 Advanced Level in e3-2012.
  - f. USGBC approved program. Other USGBC approved programs meeting the material ingredient reporting criteria.
- E. Health Product Declaration - Material Ingredient Optimization: Use permanently installed products from at least three different manufacturers that document their material ingredient optimization using the paths below. Choose either 10 compliant products, or select products that constitute at least 10%, by cost, of the total value of permanently installed products in the project.
- a. Material Ingredient Screening and Optimization Action Plan (value at 50% by cost or ½ product)
    - i. The manufacturer has screened the product to at least 1,000 ppm and has provided a publicly available inventory meeting the requirements of Option 1 and completed a detailed action plan to mitigate or reduce known hazards using the principles of green chemistry. The action plan must be product-specific (not company, manufacturer or brand), and must include the following information:
      1. Description of the screening or assessment platform used by manufacturer to complete the material ingredient screening and analysis.
      2. Identification of the specific green chemistry principles targeted for implementation in the action plan.
      3. Description of specific steps anticipated in implementation of the action plan. Include proposed changes in formulation or manufacturing processes that are planned as part of green chemistry optimization strategy.
      4. Specific dates and a full timeline for completion of all the steps described in the action plan.
  - b. Advanced Inventory & Assessment (value at 100% by cost or 1 product):
    - i. The end use product meets the requirements of any of the following:
      1. Manufacturer Inventory or Health Product Declaration: The product has demonstrated a chemical inventory to at least 0.01% by weight (100 ppm) with no GreenScreen LT-1 hazards or GHS Category 1 hazards. The HPD or Manufacturer Inventory must be third party verified.
      2. Manufacturer Inventory or HPD: The product has demonstrated a chemical inventory to at least 0.01% by weight (100ppm) and at least 75% by weight of product is assessed using GreenScreen Benchmark assessment. The remaining 25% by weight of product has been inventoried. The GreenScreen assessment must be publicly available. The HPD or Manufacturer Inventory must be third-party verified.
      3. Declare labels designated as Red List Free that are third-party verified.



4. Cradle to Cradle. Product has Material Health Certificate or is Cradle to Cradle Certified™ under standard version 3 or later with a Material Health achievement level at the Bronze level or higher.
- c. Material Ingredient Optimization (value at 150% by cost or 1.5 products)
  - i. The end use product has demonstrated a product inventory and assessment of ingredients using any of the following programs:
  - ii. Manufacturer Inventory or HPD: The product has demonstrated a chemical inventory to at least 0.01% by weight (100ppm) and at least 95% by weight of product is assessed using GreenScreen Benchmark assessment. No Benchmark 1 hazards (BM-1) are present in the end use product. The remaining 5% by weight of product not assessed has been inventoried and screened using GreenScreen List Translator and no GreenScreen LT-1 hazards are present in the end use product. The documents must be third party verified.
  - iii. Cradle to Cradle. Product has Material Health Certificate or is Cradle to Cradle Certified™ under standard version 3 or later with a Material Health achievement level at the Silver level or higher.
- d. USGBC approved program.
  - i. Products that comply with USGBC approved building product optimization criteria for material ingredient optimization and/or advanced inventory & assessment pathways.
  - ii. For credit achievement calculation, products sourced (extracted, manufactured, purchased) within 100 miles (160 km) of the project site are valued at twice their base contributing cost (or number of products), up to a maximum of 200% of cost, or 2 products.

## 2.2 LOW-EMITTING MATERIALS

Building products shall be in accordance with California Department of Public Health (CDPH) Standard Method v1.2–2017, and comply with the VOC limits in Table 4-1 of the method. Additionally, the range of total VOCs after 14 days (336 hours) was measured as specified in the CDPH Standard Method v1.2 and is reported (TVOC ranges: 0.5 mg/m<sup>3</sup> or less, between 0.5 and 5 mg/m<sup>3</sup>, or 5 mg/m<sup>3</sup> or more). Laboratories that conduct the tests must be accredited under ISO/IEC 17025 for the test methods they use. Products used in school classrooms must be evaluated using the classroom scenario, products used in other spaces must be evaluated using the default private office scenario

- A. All paints and coatings wet-applied on site shall meet the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective February 5, 2016.
  - i. Interior Flat Coating or Primer – 50 g/L
  - ii. Interior Non-Flat Coating or Primer – 50 g/L
  - iii. Anti-corrosive/Anti-rust coating – 100 g/L
  - iv. Primers/Sealers/ and Undercoaters – 100 g/L
  - v. Clear Wood Finish: Lacquer- 275 g/L
  - vi. Clear Wood Finish: Sanding Sealer -275 g/L
  - vii. Clear Wood Finish: Varnish – 275 g/L
  - viii. Clear Wood Finish: Brushing Lacquer- 275 g/L
  - ix. Floor Coatings – 50 g/L
  - x. Fire Protective Coatings – 150 g/L
  - xi. Sealers and Undercoaters – 100 g/L
  - xii. Shellac: Clear – 730 g/L
  - xiii. Shellac: Pigmented – 550 g/L



- xiv. Stain: 100 g/L
- xv. Concrete Curing Compounds: 100 g/L
- xvi. Japans/Faux Finishing Coatings: 350 g/L
- xvii. Magnesite Cement Coatings: 450 g/L
- xviii. Waterproofing Sealers – 100 g/L
- xix. Waterproofing Concrete/Masonry Sealers – 100 g/L
- xx. Wood Preservatives – 350 g/L
- xxi. Low-Solids Coatings – 120 g/L
- xxii. Colorant – Architectural coatings – 50 g/L

B. All adhesives and sealants wet-applied on site shall meet the applicable chemical content requirements of SCAQMD Rule 1168, October 6, 2017, Adhesive and Sealant Applications, as analyzed by the methods specified in Rule 1168. The provisions of SCAQMD Rule 1168 do not apply to adhesives and sealants subject to state or federal consumer product VOC regulations.

- i. Indoor Carpet Adhesives - 50 g/L
- ii. Carpet Pad Adhesives - 50 g/L
- iii. Wood Flooring Adhesive – 100 g/L
- iv. Rubber Floor Adhesives - 60 g/L
- v. Sub floor Adhesives - 50 g/L
- vi. Ceramic Tile Adhesives - 65 g/L
- vii. VCT and Asphalt Tile Adhesives - 50 g/L
- viii. Dry Wall and Panel Adhesives - 50 g/L
- ix. Cove Base Adhesives - 50 g/L
- x. Multipurpose Construction Adhesives - 70 g/L
- xi. Structural Glazing Adhesives - 100 g/L
- xii. PVC Welding - 510 g/L
- xiii. CPVC Welding - 490 g/L
- xiv. ABS Welding – 325 g/L
- xv. Plastic Cement Welding - 250 g/L
- xvi. Adhesive Primer for Plastic - 550 g/L
- xvii. Contact Adhesive - 80 g/L
- xviii. Special Purpose Contact Adhesive - 250 g/L
- xix. Structural Wood Member Adhesive - 140 g/L
- xx. Top and Trim Adhesive - 250 g/L
- xxi. Metal to Metal - 30 g/L
- xxii. Plastic Foams substrate specific - 50 g/L
- xxiii. Porous Material (except wood) substrate specific - 50 g/L
- xxiv. Wood substrate specific - 30 g/L
- xxv. Fiberglass substrate specific - 80 g/L
- xxvi. Architectural Sealant - 250 g/L
- xxvii. Roadway Sealant - 250 g/L
- xxviii. Other Sealant - 420 g/L
- xxix. Architectural, Non-Porous – Sealant Primer – 250 g/L
- xxx. Architectural, Non-Porous– Sealant Primer – 775 g/L
- xxxi. Other– Sealant Primer 750 g/L

C. If the applicable regulation requires subtraction of exempt compounds, any content of intentionally added exempt compounds larger than 1% weight by mass (total exempt compounds) shall be disclosed.



- D. Methylene chloride and perchloroethylene shall not be intentionally added in paints, coatings, adhesives, or sealants.
- E. Composite Wood Evaluation. Product meets one of the following:
- a. EPA TSCA Title VI or California Air Resources Board (CARB) ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or
  - b. EPA TSCA Title VI or CARB ATCM formaldehyde requirements for no added formaldehyde resins (NAF).
  - c. Tested per EN 717-1:2014 for formaldehyde emissions and complies with emissions class E1.
  - d. Structural composite wood product made with moisture resistant adhesives meeting ASTM 2559, no surface treatments with added urea-formaldehyde resins or coatings, and certified according to one of the following industry standards:
    - i. Plywood: compliant in accordance with Voluntary Product Standard - Structural Plywood (PS 1-09), Voluntary Product Standard – Performance Standard for Wood-Based Structural-Use Panels (PS 2-10), or one of the standards considered by CARB to be equivalent to PS 1 or PS 2: (AS/NZS 2269, EN 636 3S (including CE label), Canadian
    - ii. Standards Association CSA O121 for Douglas fir plywood, CSA O151 for Canadian softwood plywood, for CSA O153 Poplar plywood, or CSAO325 for Construction sheathing)
    - iii. Oriented strand board: specified with the Exposure 1 or Exterior bond classification in accordance with Voluntary Product Standard – Performance Standard for Wood-Based Structural-Use Panels (PS 2-10)
    - iv. Structural composite lumber: compliant in accordance with Standard Specification for Evaluation of Structural Composite Lumber Products (ASTM D 5456-13) o Glued laminated timber: compliant in accordance with Structural Glued Laminated Timber (ANSI A190.1-2012)
    - v. -joists compliant in accordance with Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists (ASTM D 5055-13)
    - vi. Cross-laminated timber: compliant in accordance with Standard for Performance-Rated Cross-Laminated Timber (PRG 320-15)
    - vii. Finger-jointed lumber labeled “Heat Resistant Adhesive (HRA)” in accordance with the American Softwood Lumber Standard (DOC PS-20 2015)

## 2.3 INDOOR AIR QUALITY

- A. Air filters treating outdoor air installed in the air handling unit shall have a MERV rating of 13 or higher.

## 2.4 WATER EFFICIENCY

- A. Install only EPA WaterSense Labeled water closets, showerheads, and urinals. Refer to Section 220000 - Plumbing.
- B. Install only ENERGY STAR clothes washers, dishwashers, and ice machines.
- No equipment or appliances that reject heat may use once through cooling with potable water.



## PART 3 EXECUTION

### 3.1 CONSTRUCTION ACTIVITY POLLUTION PREVENTION

- A. SS prerequisite: Comply with Division 31 Section "Erosion and Sedimentation Control Plan"

### 3.2 CONSTRUCTION WASTE MANAGEMENT

- A. MR prerequisite and MR credit: Comply with Division 1 Section "Construction Waste Management." Divert at least 75% of construction and demolition waste from landfill from at least 4 material streams.

### 3.3 INDOOR AIR QUALITY CONSTRUCTION MANAGEMENT PLAN – DURING CONSTRUCTION

- A. LEED IEQ credit Construction IAQ Management Plan: Comply with Division 1 Section "Indoor Air Quality Management"
- B. During construction Trade Contractor shall meet or exceed the minimum requirements of the SMACNA IAQ Guideline for Occupied Buildings under Construction, 2nd Edition, 2007, ANSI/SMACNA 008-2008 (Chapter 3).
- C. Temporary Construction Ventilation: Prime Trade Contractor shall Maintain sufficient temporary ventilation of areas where materials are being used that emit VOC's, and maintain ventilation continuously during installation, and until emissions dissipate after installation. If continuous ventilation is not possible via the building's HVAC system(s) then ventilation shall be supplied via open windows and temporary fans, sufficient to provide no less than three air changes per hour. Prime Trade Contractor shall ensure that:
  - a. The period after installation shall be sufficient to dissipate odors and elevated concentrations of VOCs. Where no specific period is stated in these Specifications, a time period of 72 hours shall be used.
  - b. All areas shall be vented directly to outside. Areas shall not be vented to other enclosed areas.
- D. During dust producing activities (e.g. drywall installation and finishing) ventilation system shall be off, and openings in supply and return HVAC system shall be protected from dust infiltration. Provide temporary ventilation as required.
- E. Preconditioning: Prior to installation, Prime Trade Contractor shall allow products which have odors and VOC emissions to off-gas in dry, well-ventilated space outside of building for 14 calendar days, in order to allow for reasonable dissipation of odors and emissions.
- F. Prime Trade Contractor shall complete all interior finish material installation prior to Substantial Completion to allow time for building flush out as described below. Submit notification to Owner's Representative when all interior finish material installation is complete, highlighting the date of completion.

### 3.4 INDOOR AIR QUALITY CONSTRUCTION MANAGEMENT PLAN – POST CONSTRUCTION

- A. Building Flush Out: Select one of the following two options (prior to occupancy or during occupancy), to be implemented after construction ends and the building been completely cleaned. All interior finishes, such as millwork, doors, paint, carpet, acoustic tiles, and movable furnishing, must be installed, and major VOC punch list items must be finished.
  - a. Prior to Building Occupancy: Prime Trade Contractor shall install new filtration media and perform a building flush-out by supplying a total air volume of 14,000 cubic feet of outdoor air per square foot of gross floor area while maintaining an internal temperature of at least 60°F (15°C) and no higher than 80°F (27°C) and relative humidity no higher than 60%. The duration of the flush-out must be calculated as follows:



Cubic feet of outdoor air needed prior to occupancy = Area (ft<sup>2</sup>) X 14,000 cfm  
Duration (Days) = Cubic Feet needed/(air handler capacity/1440 minutes/day)

- i. Replace all outside air filtration media prior to occupancy. Filtration media shall have a MERV of 13 as determined by ASHRAE 52.2.
- b. During Occupancy: if occupancy is desired before the flush-out is completed, the space may be occupied only after delivery of a minimum of 3,500 cubic feet of outdoor air per square foot of gross floor area while maintaining an internal temperature of at least 60°F (15°C) and no higher than 80°F (27°C) and relative humidity no higher than 60%.  
Once the space is occupied, it must be ventilated at a minimum rate of 0.30 cubic foot per minute (CFM) per square foot of outdoor air or the design minimum outdoor air rate determined by the ASHRAE 62.1-2010 calculations determined in IEQ Prerequisite Minimum indoor Air Quality performance, whichever is greater. During each day of the flush-out period, ventilation must begin at least three hours before occupancy and continue during occupancy. These conditions must be maintained until a total of 14,000 cubic feet per square foot of outdoor air has been delivered to the space. The duration of the flush-out must be calculated as follows:

Cubic feet of outdoor air needed prior to occupancy = Area (ft<sup>2</sup>) X 3,500 cfm  
Cubic feet of outdoor air needed during occupancy = Area (ft<sup>2</sup>) X 10,500 cfm  
Duration (Days) = (Area (ft<sup>2</sup>) X 14,00 cfm)/(air handler capacity/1440 minutes/day)

- B. IAQ Testing: After construction ends and before occupancy, but under ventilation conditions typical for occupancy, conduct IAQ testing using protocols consistent with the methods in the table below for all occupied spaces.
  - a. Use current versions of ASTM standard methods, EPA compendium methods, or ISO methods, as indicated.
  - b. Conduct all measurements before occupancy during normal occupied hours, with the building ventilation system started at the normal daily start time and operated at the minimum outdoor airflow rate for the occupied mode throughout the test.
  - c. For each sampling point where the concentrations exceed the limit, take corrective action and retest for the noncompliant contaminants at the same sample points. Repeat until all requirements are met.

Test for the particulate matter (PM) and inorganic gases listed in Table 1, using an allowed test method, and demonstrate the contaminants do not exceed the concentration limits listed in the table.





**Table 1.**

<b>Contaminant (CAS#)</b>	<b>Concentration Limit (µg/m3)</b>	<b>Allowed Test Methods</b>
Carbon monoxide (CO)	9 ppm; no more than 2 ppm above outdoor levels	ISO 4224 EPA Compendium Method IP-3 GB/T 18883-2002 for projects in China  Direct calibrated electrochemical instrument with accuracy of (+/- 2% ppm <50 ppm minimum accuracy).
PM 10	ISO 14644-1:2015, cleanroom class of 8 or lower 50 µg/m3 Healthcare only: 20 µg/m3	Particulate monitoring device with accuracy greater of 5 micrograms/m3 or 20% of reading and resolution (5 min average data) +/- 5 µg/m3
PM 2.5	12 µg/m3 or 35 µg/m3**	
Ozone	0.07 ppm	Monitoring device with accuracy greater of 5 ppb or 20% of reading and resolution (5 min average data) +/- 5 ppb  ISO 13964 ASTM D5149 — 02 EPA designated methods for Ozone

Perform a screening test for Total Volatile Organic Compounds (TVOC). Use ISO 16000-6, EPA TO-17, or EPA TO-15 to collect and analyze the air sample. Calculate the TVOC value per EN 16516:2017, CDPH Standard Method v1.2 2017 section 3.9.4, or alternative calculation method as long as full method description is included in test report. If the TVOC levels exceed 500 µg/m3, investigate for potential issues by comparing the individual VOC levels from the GC/MS results to associated cognizant authority health-based limits. Correct any identified issues and re-test if necessary.

Additionally, test for the individual volatile organic compounds listed in Table 2 using an allowed test method and demonstrate the contaminants do not exceed the concentration limits listed in the table.



**Table 2.**

<b>Contaminant (CAS#)</b>	<b>Concentration Limit (µg/m3)</b>	<b>Allowed Test Methods</b>
Formaldehyde 50-00-0	20 µg/m3 (16 ppb)	ISO 16000-3, 4; EPA TO-11a, EPA comp. IP-6A ASTM D5197-16
Acetaldehyde 75-07-0	140 µg/m3	
Benzene 71-43-2	3 µg/m3	ISO 16000-6 EPA IP-1, EPA TO-17, EPA TO-15 ISO 16017-1, 2; ASTM D6196-15
Hexane (n-) 110-54-3	7000 µg/m3	
Naphthalene 91-20-3	9 µg/m3	
Phenol 108-95-2	200 µg/m3	
Styrene 100-42-5	900 µg/m3	
Tetrachloroethylene 127-18-4	35 µg/m3	
Toluene 108-88-3	300 µg/m3	
Vinyl acetate 108-05-4	200 µg/m3	
Dichlorobenzene (1,4-) 106-46-7	800 µg/m3	
Xylenes-total 108-38-3, 95-47-6, and 106-42-3	700 µg/m3	

**3.5 COMMISSOINING**

- A. EA prerequisite and EA credit: Comply with Division 1 Section "General Commissioning Requirements"

LEED SCORECARD – follows

LEED SUBMITTAL COVER SHEET – follows

LEED SUBMITTAL REQUIREMENTS – follows

LEED MONTHLY REPORT TEMPLATE – follows

END OF SECTION 01 81 13



SECTION 02 41 19

SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections provided by DDC, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
  - 1. Demolition and removal of amenities, pavement, miscellaneous concrete, debris, and all additional items noted on the plans.
  - 2. Salvaging of various site amenities.
  - 3. Abandoning in place or removing below-grade construction.
  - 4. Disconnecting, capping or sealing, and abandoning in-place or removing site utilities.
- B. Related Sections include the following:
  - 1. Division 01 Section 01 32 33 "Photographic Documentation" for preconstruction photographs taken before removals.
  - 2. Division 31 Section 31 10 00 "Site Clearing" for site clearing and removal of above- and below-grade site improvements not part of selective structure demolition.

1.3 DEFINITIONS

- A. Demolish: Completely remove and legally dispose of off-site.
- B. Recycle: Recovery of demolition waste for subsequent processing in preparation for reuse.
- C. Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse. Include fasteners or brackets needed for reattachment elsewhere.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.5 SUBMITTALS

- A. Proposed Protection Measures: Submit informational report, including drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, and for dust control. Indicate proposed locations and construction of barriers.



1. Adjacent Improvements: Detail special measures proposed to protect adjacent improvements to remain.

B. Schedule of Demolition Activities: Indicate the following:

1. Detailed sequence of demolition work, with starting and ending dates for each activity.
2. Salvaging of items to be reused or retained by the Owner.
3. Temporary interruption of utility services.
4. Shutoff and capping or re-routing of utility services.

C. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.

D. Predemolition Video: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by building demolition operations. Comply with Division 01 Section "Photographic Documentation". Submit before the Work begins.

E. Landfill Records: Indicate receipt and acceptance of hazardous wastes by an EPA approved landfill facility licensed to accept hazardous wastes.

#### 1.6 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI A10.6 and NFPA 241.

#### 1.7 PROJECT CONDITIONS

A. Improvements immediately adjacent to demolition area will be occupied. Conduct demolition so operations of neighboring park areas will not be disrupted.

1. Provide not less than 72 hours' notice of activities that will affect operations of the Owner.
2. Maintain access to existing exits and other facilities used by employees and visitors of the garages.

a. Do not close or obstruct exits or other facilities used by employees and visitors of the garages without written permission from authorities having jurisdiction.

B. Owner assumes no responsibility for items to be demolished.

1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Hazardous Materials: Potential hazardous materials have been identified and are discussed in the Appendices.



1. If materials suspected of containing hazardous materials are encountered, that were not identified in the attached bid documents, do not disturb; immediately notify Engineer and Owner.

D. On-site storage or sale of removed items or materials is not permitted.

#### 1.8 COORDINATION

- A. Arrange demolition schedule so as to not interfere with operations of neighboring facilities.

#### 1.9 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting removal operations.
- B. Review Project Record Documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations. Comply with Division 01 Section "Photographic Documentation".

#### 1.10 PREPARATION

- A. Existing Utilities: Locate, identify, disconnect, and seal or cap off indicated utilities as shown on the plans.
  1. Cut off pipe or conduit a minimum of 24 inches below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.

#### 1.11 PROTECTION

- A. Existing Facilities: Protect adjacent facilities during demolition operations.
- B. Existing Utilities: Maintain utility services to remain and protect from damage during removal operations.
  1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.
- C. Temporary Protection: Erect temporary protection, such as walks, fences, canopies, and covered passageways, where required by authorities having jurisdiction. Comply with requirements in Division 01 Section "Temporary Facilities and Controls".
  1. Protect adjacent facilities from damage due to removal activities.
  2. Protect existing site improvements, appurtenances, and landscaping to remain.
  3. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  4. Provide protection to ensure safe passage of people around demolition area and to and from occupied portions of adjacent facilities.



- D. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

#### 1.12 SALVAGE

- A. Disconnect and remove existing items to be salvaged. Take care to ensure that salvaged items are not damaged during removal or transport operations.
- B. Store existing items to be salvaged in a protected area to prevent theft, vandalism, or damage. Items may not be stored within the boundary of the temporary lot, but may be stored within the project site or off-site at the discretion of the Contractor.
- C. Reinstall salvaged items scheduled to be reused.

#### 1.13 DEMOLITION, GENERAL

- A. General: Demolish structures labeled to be removed and site improvements completely. Use methods required to complete the Work within limitations of governing regulations and as follows:
  - 1. Do not use explosives.
- B. Engineering Surveys: During removal activities, perform surveys to detect hazards that may result from demolition activities.
- C. Site Access and Temporary Controls: Conduct demolition and debris-removal operations to ensure minimum interference with roads, walks, offices, and other adjacent occupied and used facilities.
  - 1. Do not close or obstruct adjacent streets, offices, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
  - 2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- D. Explosives: Use of explosives is not permitted.

#### 1.14 DEMOLITION BY MECHANICAL MEANS

- A. Below-Grade Construction: Demolish walls and other below-grade construction.
  - 1. Remove below-grade construction noted to be demolished, completely.

#### 1.15 SITE RESTORATION

- A. Below-Grade Areas: Rough grade below-grade areas ready for new construction.



1.16 REPAIRS

- A. Promptly repair damage to adjacent property caused by demolition operations.

1.17 DISPOSAL OF DEMOLISHED MATERIALS

- A. Demolition waste materials shall be removed from the Project site and legally disposed of in an EPA-approved landfill acceptable to authorities having jurisdiction.
  - 1. Do not allow demolished materials to accumulate on-site.
  - 2. Remove debris in a manner that will prevent spillage on adjacent surfaces and areas.
  - 3. The Contractor shall remove and legally dispose of all demolished materials.
- B. Do not burn demolished materials.

1.18 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing before building demolition operations began.

END OF SECTION 02 41 19



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SECTION 03 10 00

CONCRETE FORMWORK

PART 1 - GENERAL

1.1 GENERAL

Work of this Section shall conform to requirements of Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections.

1.2 SCOPE

Provide all labor, materials, equipment, services and transportation for formwork and related accessories required to complete all cast-in-place concrete work as shown on Drawings, as specified herein, and as required by the job conditions.

1.3 RELATED WORK SPECIFIED IN OTHER SECTIONS

Submittals	Division 1 as provided by DDC
Quality Control	Division 1 as provided by DDC
Quality Assurance: Structural Testing and Inspection	Section 014500
Concrete Reinforcement and Embedded Assemblies	Section 032000
Cast-In-Place Concrete	Section 033000
Thermal and Moisture Protection	Division 7

1.4 CODES AND STANDARDS

A. Building Code: Concrete work shall conform to the requirements of the Building Code identified on the Structural General Notes, and OSHA requirements, except where more stringent conditions or criteria occur in the standards referenced below and on the Drawings.

B. Standards:

1. ACI 117 – Standard Specifications for Tolerances for Concrete Construction and Materials.
2. ACI 237 – Self Consolidating Concrete.
3. ACI 301 – Specifications for Structural Concrete.
4. ACI 318 – Building Code Requirements for Structural Concrete and Commentary.



5. ACI 347 – Guide to Formwork for Concrete.
6. ACI 347.2R – Guide for Shoring/Reshoring of Concrete Multistory Buildings

## 1.5 CONTRACTOR QUALIFICATIONS

- A. The work of this section shall be performed by a company specializing in the type of concrete formwork required for this Project, with a minimum of 10 years of documented successful experience and shall be performed by skilled workers thoroughly experienced in the necessary crafts.

## 1.6 FORMWORK DESIGN

- A. Design of Formwork, Shoring/Reshoring, and its removal is the Contractor's responsibility.
- B. Design, erect, support, brace and maintain formwork so that it will safely support vertical and lateral loads per SEI/ASCE 37-02 that might be applied, until such loads can be supported by the concrete structure.
- C. Design Requirements:
  1. Forms shall be designed for fabrication and erection in accordance with Design Professionals' requirements and recommendations of ACI 301, 318 and 347.
  2. Design formwork in a manner such that the total construction load does not at any time exceed the total design load of new or existing construction and accounts for concrete age and relative strength at time of loading. See Section 3.2 for shoring/reshoring requirements.

## PART 2 - PRODUCTS

### 2.1 FORMWORK REQUIREMENTS

- A. General Requirements:
  1. Formwork shall meet construction safety regulations for the state where the project is located.
  2. Forms shall be removable without impact, shock or damage to concrete surfaces, the structure and adjacent materials.



3. Forms shall be tight-fitting, designed and fabricated for required finishes and to withstand concrete weight and maintain tolerances as specified in ACI 117 for the following designations: (See architectural drawings for locations).
  - a) Class A – For surfaces prominently exposed to public view where appearance is of special importance.
  - b) Class B – Coarse-textured concrete-formed surfaces intended to receive plaster, stucco or wainscoting.
  - c) Class C – General Standard for permanently exposed surfaces where other finishes are not specified.
4. Class D - Minimum quality surface where roughness is not objectionable, usually applied where surfaces will be concealed. Furnish forms in largest practicable sizes to minimize number of joints and to conform to joint system shown on Drawings, using form materials with sufficient thickness to withstand pressure of newly-placed concrete without bow or deflection.
5. Butt Joints: Shall be solid and complete with backup material to prevent leakage of cement paste.

## PART 3 - EXECUTION

### 3.1 FORMWORK

#### A. General:

1. Inspect areas to receive formwork.
2. Construct forms to sizes, shapes, lines, and dimensions shown on Contract Documents, and to obtain accurate alignment, location, grades, level and plumb work in finished structures.
3. Provide formwork sufficiently tight to prevent leakage of cement paste during concrete placement. Solidly butt joints and provide backup material at joints as required to prevent leakage and fins, and to maintain alignment.
4. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, drips, bevels, chamfers, blocking, screeds, bulkheads, anchorages and inserts and other features required in the Work.
5. Comply with shop drawings, ACI 301, 318, 347 and Contract Documents.
6. Maintain formwork and finished work construction tolerances complying with ACI 301 and 117.

#### B. Concrete Accessories and Embedded Items:



1. Install into forms concrete accessories, sleeves, inserts, anchor bolts, anchorage devices and other miscellaneous embedded items furnished by other trades or that are required for other work that is attached to or supported by cast-in-place concrete.
  - a) Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached.

### 3.2 REMOVING FORMS

- A. Formwork not supporting the weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50°F (10°C) for 12 hours after placing concrete, provided concrete is sufficiently hard to avoid damage by form-removal operations, and provided curing and protection operations are maintained after removal of formwork.
- B. Formwork supporting the weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed until concrete has attained at least 75% of design compressive strength

### 3.3 RE-USING FORMS

- A. Before forms can be re-used, surfaces that will be in contact with freshly poured concrete must be thoroughly cleaned, damaged areas repaired, and projecting nails withdrawn.
  1. Split, frayed, delaminated or otherwise damaged form-facing material will not be acceptable.
  2. Apply new form release agent on re-used forms.

END OF SECTION 03 10 00



SECTION 03 20 00

CONCRETE REINFORCEMENT AND EMBEDDED ASSEMBLIES

PART 1 - GENERAL

1.1 GENERAL

Work of this Section shall conform to requirements of Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections.

1.2 SCOPE

Provide all labor, materials, equipment, services and transportation for reinforcing steel, accessories, embedments and miscellaneous anchorage accessories, joint fillers, and waterstops for cast-in-place concrete work as shown on Drawings, as specified herein, and as required by the job conditions.

1.3 RELATED WORK SPECIFIED IN OTHER SECTIONS

Submittals	Division 1 as provided by DDC
Quality Control	Division 1 as provided by DDC
Quality Assurance: Structural Testing and Inspection	Section 014500
Concrete Formwork	Section 031000
Cast-In-Place Concrete	Section 033000
Thermal and Moisture Protection	Division 7

1.4 CODES AND STANDARDS

A. Building Code: Concrete work shall conform to the requirements of the Building Code identified on the Structural General Notes, and OSHA requirements, except where more stringent conditions or criteria occur in the standards referenced below and on the Drawings.

B. Standards:

1. ACI 117 – Standard Specifications for Tolerances for Concrete Construction and Materials.
2. ACI 301 – Specifications for Structural Concrete.
3. ACI 315 – Details and Detailing of Concrete Reinforcement.
4. ACI 318 – Building Code Requirements for Structural Concrete and Commentary.



5. ACI 355.2 – Qualification of Post-Installed Mechanical Anchors in Concrete and Commentary
6. ACI 355.4 – Qualification of Post-Installed Adhesive Anchors in Concrete and Commentary
7. American Society for Testing and Materials "ASTM Standards in Building Codes", various standards as referenced herein.
8. AWS D1.1 – Structural Welding Code-Steel.
9. AWS D1.4 – Structural Welding Code-Reinforcing Steel.
10. CRD C 572 – Specification for Polyvinylchloride Waterstops.
11. Concrete Reinforcing Steel Institute "Manual of Standard Practice"
12. ASTM D3963 Fabrication and Jobsite Handling of epoxy Coated Steel Reinforcing Bars.

## 1.5 CONTRACTOR QUALIFICATIONS

- A. The work of this section shall be performed by a fabricator specializing in the type of reinforcement fabrication required for this Project, with a minimum of 10 years of documented successful experience and shall be performed by skilled workmen thoroughly experienced in the necessary crafts.
  1. Welders shall be qualified in accordance with applicable AWS Code within 12 months before starting the work.
    - a) Make qualification records available to the Design Professionals upon request.
- B. Manufacturers shall specialize in manufacturing the types of concrete accessories required for cast-in-place concrete work, with a minimum of 10 years of documented successful experience and shall have the facilities capable of meeting all requirements of Contract Documents as a single-source responsibility and warranty for each type of accessory.

## PART 2 - PRODUCTS

### 2.1 REINFORCEMENT

- A. Reinforcing Steel:
  1. Type: Deformed billet steel bars, ASTM A 615, Grade 60 or 75 as indicated on Drawings.
  2. Size: As indicated on structural Drawings.



3. Where indicated on Drawings, reinforcing steel shall be hot-dipped galvanized after fabrication in accordance with ASTM A 767, Class II, with galvanizing material protected from embrittlement during galvanizing process in accordance with ASTM A 143.
    - a) Galvanized finish shall meet the bend and shear test requirements of ASTM A 615.
  4. Epoxy-Coated: ASTM A 775 where indicated on Drawings.
  5. Weldable reinforcement: ASTM A 706 where indicated on Drawings.
- B. Welded Wire Reinforcement:
1. Type: steel wire, deformed, ASTM A1064.
  2. Size: As indicated on structural Drawings.
  3. Where indicated on Drawings, welded wire reinforcement shall be hot-dipped galvanized after fabrication in accordance with ASTM A 1060, , with galvanizing material protected from embrittlement during galvanizing process in accordance with ASTM A 143.
    - a) Galvanized finish shall meet the bend and shear test requirements of ASTM A 615.
  4. Plain Steel Welded Wire Reinforcement: ASTM A 1064.
  5. Deformed Steel Welded Wire Reinforcement: ASTM A 1064.
  6. Epoxy-Coated Welded Wire Reinforcement: ASTM A 884, Class A.
- C. Reinforcement Coating Repair Materials:
1. Apply repair coating in accordance with the manufacturer's written procedures.
  2. Galvanized Repair Coating: Zinc-based solder, paint containing zinc dust or sprayed zinc complying with ASTM A780.
  3. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/ A 775M.
    - a) The maximum amount of repaired damaged areas shall not exceed 2% of the surface area in each linear foot of each bar. If more than 2% of the surface area in each linear foot of bar is damaged, bar shall be replaced.



## 2.2 LEED REQUIREMENTS

### PART 3 - EXECUTION

#### 3.1 FABRICATION

##### A. Reinforcing Steel Fabrication:

1. Fabricate in accordance with approved shop Drawings, ACI 315 and Contract Documents.
2. Heating of Reinforcement: Will be permitted only with specific prior approval of the SER.
3. Welding: Comply with ANSI/AWS D1.4; use E9018 electrodes or approved electrodes.
4. Tolerances: Comply with ACI 117.
5. Unacceptable Materials: Reinforcement with any of following defects will not be permitted in Work.
  - a) Bar lengths, depths, and bends exceeding ACI fabrication tolerances.
  - b) Bends or kinks not indicated on Drawings or final shop drawings.
  - c) Bars with reduced cross-section due to excessive rusting or other cause.

#### 3.2 INSTALLATION OF REINFORCEMENT

##### A. General:

1. Perform the work of this section in accordance with approved shop drawings, ACI 318 and CRSI recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as specified.
2. Before placing reinforcement steel, inspect forms for proper fitting and compliance with allowable tolerances.
3. Reinforcement shall be free of form coatings, sealers, powdered and scaled rust, loose mill scale, earth, ice, and other materials which will reduce or destroy bond with concrete.
4. Do not place concrete until the completed reinforcement steel work has been observed and accepted by Owner's Testing Laboratory.
5. Reinforcement steel is not permitted to be "floated into position".
6. Bend bars cold.
  - a) Do not heat or flame cut bars.
  - b) No field bending of bars partially embedded in concrete is permitted, unless specifically approved by the SER and tested by Testing Agency for cracks.





7. Weld only as indicated.

- a) Perform welding per ANSI/AWS D12.1 and/or ANSI/AWS D1.4.
- b) See structural Drawings for additional requirements.

### 3.3 INSTALLATION OF POST-INSTALLED ADHESIVE ANCHORS

A. General:

- 1. Post-installed adhesive anchors shall be installed in accordance with the Manufacturer's Printed Installation Instructions (MPII).

### 3.4 INSTALLATION OF ACCESSORIES AND EMBEDDED ITEMS

A. Install concrete accessories in accordance with manufacturer's published instructions and Contract Documents.

END OF SECTION 03 20 00



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

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SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 GENERAL

Work of this Section shall conform to requirements of Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections.

1.2 SCOPE

Provide all labor, materials, equipment, services and transportation required to complete all concrete work as shown on Drawings, as specified herein, and as required by the job conditions. This Specification is not intended to address the particular requirements of Architectural Concrete.

1.3 RELATED WORK SPECIFIED IN OTHER SECTIONS

Submittals	Division 1 as provided by DDC
Quality Control	Division 1 as provided by DDC
Quality Assurance: Structural Testing and Inspection	Section 014500
Concrete Formwork	Section 031000
Concrete Reinforcement and Embedded Assemblies	Section 032000
Thermal and Moisture Protection	Division 7

1.4 CODES AND STANDARDS

A. Building Code: Concrete work shall conform to the requirements of the Building Code identified on the Structural General Notes, and OSHA requirements, except where more stringent conditions or criteria occur in the standards referenced below and on the Drawings.

B. Standards:

1. ACI 117 – Standard Specifications for Tolerances for Concrete Construction and Materials except as modified by more stringent requirements in the Project Specifications and/or Drawings.
2. ACI 237 – Self Consolidating Concrete.
3. ACI 301 – Specifications for Structural Concrete.



4. ACI 318 – Building Code Requirements for Structural Concrete and Commentary.
5. American Concrete Institute “Manual of Concrete Practice”, various committee reports as referenced herein.
6. American Society for Testing and Materials "ASTM Standards in Building Codes", various standards as referenced herein.
7. AASHTO T318 – Standard Method of Test for Water Content of Freshly Mixed Concrete Using Microwave Oven Drying.

## 1.5 CONTRACTOR QUALIFICATIONS

- A. The work of this section shall be performed by a company specializing in the type of concrete work required for this Project, with a minimum of 10 years of documented successful experience and shall be performed by skilled workmen thoroughly experienced in the necessary crafts.
- B. Contractor’s testing agency services: Required as specified in Division 1, and herein.

## 1.6 SUBMITTALS

- A. Required Submittals - Where the SUBMITTALS section of this Specification is in conflict with Division 1 Submittals, the more stringent requirements for the Contractor apply. Required submittal items are listed here; see below for detailed requirements. Do not submit items not requested. Reproduction of structural drawings for shop drawings is not permitted.

- (1) Submittal Schedule
- (2) Mix Designs
- (3) Concrete Travel Times to the Project Site
- (4) Hot and Cold Weather Procedures
- (5) Product Data
- (6) Concrete Joint Locations
- (7) Comprehensive Layout Drawings
- (8) Preconstruction Survey
- (9) Survey of Flat Plate or Flat Slab Concrete Floors during construction
- (10) FF/FL Testing
- (11) Structural Repairs
- (12) Patching Defective Concrete Finishes
- (13) Conduit and Pipes Embedded in Concrete
- (14) Hazardous Materials Notification
- (15) LEED Submittals



1.7 QUALITY ASSURANCE BY OWNER'S TESTING AGENCY

- A. See Section 014500.

1.8 QUALITY CONTROL BY CONTRACTOR

- A. The Contractor shall provide a program of quality control to ensure that the minimum standards specified herein are attained.

1.9 OBSERVATIONS AND CORRECTIONS BY DESIGN PROFESSIONALS

- A. Observations: The Design Professionals will observe the construction for general compliance with the provisions of the Contract Documents during various phases of construction.
- B. Corrections by Design Professionals: See Part 3 - CORRECTIVE MEASURES section of this Specification.

1.10 PERMITS AND WARRANTY

- A. Permits: The Contractor shall apply for, procure, renew, maintain, and pay for all permits required by City, State, or other governing authorities, necessary to execute work under this Contract. Contractor shall furnish copies of all permits to the Owner and Design Professionals.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS AND PRODUCTION

- A. Portland Cement:
  - 1. ASTM C150, Type I or Type II
  - 2. ASTM C150, Type III, High-early Strength Portland Cement may be used subject to review and approval of the SER. The specified 28-day concrete compressive strength shall occur within 7 days for concrete using Type III Portland Cement.
  - 3. Provide the same brand of Portland Cement from a single source throughout the project, as required to meet Design Professionals' requirements.
  - 4. Provide Portland Cement that is uniform in color.



## 2.2 CONCRETE MIX DESIGN

### A. Concrete Strength:

1. Shall be as indicated on the Structural Drawings

### B. Concrete Density (Unit Weight):

1. Shall be as indicated on the Structural Drawings

### C. Air Entrainment

1. For concrete exposed to freeze/thaw cycles and/or deicing chemicals (ACI 318 Exposure Classes F1, F2, F3), and concrete intended to be watertight, provide entrained air content of  $6\% \pm 1.5\%$ , unless specified otherwise. This includes, but is not limited to, concrete at the following locations:

### D. Water-Cementitious Materials Ratio (w/cm) for Normalweight Concrete

1. Unless lower limits are stated in the Contract Documents, all concrete exposed to freezing and thawing in moist condition (Exposure Classes F1 and F2) and/or required to be watertight shall have a maximum w/cm of 0.45 and a minimum  $f'c=4500$  psi .
2. Concrete used in slab on grade shall have a maximum w/cm ratio of 0.45.
3. All concrete exposed to deicing salts, brackish water seawater or spray from these sources (Exposure Class F3) shall have a maximum w/cm of 0.40 and a minimum  $f'c=4500$  psi.
4. Absent the above conditions, all concrete with required strength of 4000 psi (28MPa) or higher shall have a maximum w/cm of 0.50.
5. The water-cementitious materials ratio shall not exceed values indicated, including any water added to meet specified slump in accordance with the requirements of ASTM C 94.
6. Weight of fly ash and other pozzolanic materials shall be included with the weight of cementitious materials used to determine the water-cementitious materials ratio.

## 2.3 ADMIXTURES

### A. General:

1. Admixtures specified below can be used only when established in the mix design with Design Professionals' prior written approval.



2. Each admixture approved by Design Professionals shall be used in strict compliance with manufacturer's published instructions.
3. Concrete supplier shall certify all admixtures to be compatible with each other. (See Submittals Section in Part 1)

## 2.4 FIBER REINFORCEMENT

### A. General:

1. Fiber reinforcement specified below can be used only with Design Professional's prior written approval.
2. See Drawings for location of Fibers.
3. Where macro synthetic fiber reinforcement is proposed as a substitution request to replace welded wire reinforcement, Contractor shall demonstrate that proposed material and dosage rate provides equivalent performance to the welded wire reinforcement indicated on Drawings.
4. Fiber reinforcement shall not replace reinforcing bars shown on Drawings.

## 2.5 LEED REQUIREMENTS

# PART 3 - EXECUTION

## 3.1 TOLERANCES

- A. Work shall conform to all requirements of ACI 117 except as modified by more stringent requirements in the Project Specifications and/or Drawings.

## 3.2 MASS CONCRETE

- A. General: The requirements of this part of the specification are in addition to all other applicable requirements of this specification.
- B. Definition: Mass Concrete elements are those footings, pile caps and mats that have a smallest dimension (mat thickness for example) greater than or equal to 4 feet (1220mm), and other elements where indicated on the drawings.

END OF SECTION 03 30 00



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

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SECTION 03 41 00 –

STRUCTURAL PRECAST CONCRETE WITH COMMERCIAL ARCHITECTURAL FINISH

PART 1 - GENERAL

1.1 Summary

- A. This Section includes the performance criteria, materials, design, production, and erection of structural precast and precast, prestressed concrete with a commercial architectural (CA) finish for the entire project. The work performed under this Section includes all labor, material, equipment, related services, and supervision required for the manufacture, delivery, erection, and joint sealants of the structural precast and precast, prestressed concrete work shown on the Contract Drawings.

1.2 Quality Assurance

- A. Fabricator Qualifications: A firm that complies with the following requirements and is experienced in producing structural precast concrete units similar to those indicated for this Project and with a record of successful in-service performance.

1. Assumes responsibility for engineering structural precast concrete units to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer licensed in the State of New York.
2. Participates in PCI's Plant Certification program and is designated a PCI-certified plant for Group C or CA, **Category C3/C3A – Prestressed Straight-Strand Structural**.

- B. Erector's Qualifications:

1. Erector Certification: A precast concrete erector with erecting organization and all erecting crews Certified and designated, prior to beginning work at project site, by PCI's Certificate of Compliance to erect **Category S2 Complex Structural Systems for load-bearing members**.
2. Regularly engaged for at least 5 years in the erection of precast structural concrete similar to requirements of this project.

1.3 Sustainability Requirements

- A. Reference specification section 01 81 13.

PART 2 - PRODUCTS

2.1 Products

- A. Formwork

1. Provide forms and, where required, form facing materials of metal, plastic, wood, or other acceptable material that is non-reactive with concrete and will produce required finish surfaces.



**B. Reinforcing Materials**

1. Reinforcing Bars:

- a. ASTM A 615, Grade 60, unless otherwise indicated.
- b. ASTM A 706/A, deformed low-alloy steel reinforcing bars for welded reinforcement.
- c. ASTM A955, Stainless Steel.

2. Tendons:

- a. Prestressing Strand: ASTM A 416/A 416M, Grade 250 (Grade 1720) or Grade 270 (Grade 1860), uncoated, 7-wire, low-relaxation strand or ASTM A 886/A 886M, Grade 270 (Grade 1860), indented, 7-wire, low-relaxation strand (including supplement).

**C. Concrete Material**

1. Produce standard-weight concrete consisting of specified portland cement, aggregates, admixtures, and water to produce the following properties:

- a. Compressive strength: 5,000 psi minimum at 28 days.
- b. Compressive strength Columns: 8,000 psi minimum at 28 days, or as required by design.
- c. Release strength for prestressed units: 3,500 psi minimum or as required by design.
- d. Maximum water-cementitious material ratio: 0.45.

**D. Admixtures**

1. Use water-reducing admixtures in strict compliance with manufacturer's directions. Admixtures to increase cement dispersion, or provide increased workability for low-slump concrete, may be used subject to Architect's acceptance.

- a. Use amount as recommended by admixture manufacturer for conditions prevailing at time of placing. Adjust quantities of admixtures as required to maintain quality control.
- b. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
- c. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
- d. Water-Reducing and Accelerating Admixture ASTM C494/C 494M, Type E.
- e. High Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
- f. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.



2. Coloring Admixture: ASTM C 979, synthetic or natural mineral-oxide pigments or liquid coloring admixtures, temperature stable and nonfading.
3. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to not contain calcium chloride, or more than 0.15 percent chloride ions or other salts by weight of admixture.
  - a. Plasticizing Admixture for Flowable Concrete: ASTM C 1017/C 1017M.
  - b. Retarding Admixture: ASTM C 494/C 494M, Type B.

E. Steel Connection Material

1. **Unless noted otherwise all connections to be stainless steel. Fully embedded connections may be presented as an alternate material and will be reviewed by EOR.**

2.2 Performance Requirements

- A. General: Fabricate precast concrete units complying with manufacturing and testing procedures, quality control recommendations, and dimensional tolerances of the PCI Manual referenced above and as specified for types of units required.
- B. Plant-Mix Concrete: Comply with requirements of ASTM C 94.
- C. Finishes
  1. Standard Grade: Normal plant-run finish produced in forms that impart a smooth finish to concrete. Surface holes smaller than 1/2 inch (13mm) caused by air bubbles, normal color variations, form joint marks, and minor chips and spalls are acceptable. Fill air holes greater than 1/4 inch (6 mm) in width that occur in high concentration (more than one per 2 in.<sup>2</sup> [1300 mm<sup>2</sup>]). Major or unsightly imperfections, honeycombs, or structural defects are not permitted. Allowable joint offset limited to 1/8 inch (3 mm).
    - a. Double Tees (provide broom finish on top surface).
    - b. Interior Shearwalls
    - c. Litewalls
    - d. Inverted T beams
    - e. L beams
    - f. All horizontal edges to receive joint sealant shall be delivered to the site with 1/4" chamfer or radius per PCI recommendations.
  2. Grade B Finish: Fill air pockets and holes larger than 1/4 inch (6 mm) in diameter with sand-cement paste matching color of adjacent surfaces. Fill air holes greater than 1/8 inch (3 mm) in width that occur in high concentration (more than one per 2 in.<sup>2</sup> [1300 mm<sup>2</sup>]). Grind smooth form offsets or fins larger than 1/8 inch (3 mm). Repair surface blemishes due to dents in forms. Discoloration is permitted at form joints.
    - a. Columns



- b. Column Covers
- c. Exterior Shearwalls
- d. Spandrels
- e. All exposed wall panels.

### PART 3 - EXECUTION

#### 3.1 General Execution Requirements

- A. Furnish loose connection hardware and anchorage devices for precast concrete members to be embedded in or attached to the building structural frame or foundation before starting that Work. Provide locations, setting diagrams, templates and instructions for the proper installation of each anchorage device.
- B. Precaster/Erector shall examine supporting structural frame, foundation and conditions for compliance with requirements for installation tolerances, bearing surface tolerances, and other conditions affecting precast concrete performance. **Any defects shall be identified and reported to the Contractor and Engineer a minimum of one week prior to erection.**
- C. Install loose clips, hangers, bearing pads, and other accessories required for connecting structural precast concrete members to supporting members and backup materials.
- D. Erect structural precast concrete level, plumb and square within the specified allowable erection tolerances. Provide temporary structural framing, shoring and bracing as required to maintain position, stability, and alignment of members until permanent connections are completed.
- E. Erect structural precast concrete members level, plumb, square, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 135. Level out variations between adjacent members by jacking, loading, or any other feasible method as recommended by the fabricator and acceptable to the Engineer.
- F. Repairs will be permitted provided structural adequacy, serviceability and durability of members and appearance are not impaired as determined by the Engineer.
- G. **Durability and serviceability of this structure is paramount to the Owner and any repairs or non compliant materials that reduce these are not likely to be accepted. It is critical that the fabricator ensure that all connections align and the precast is not damaged when it arrives on site. It is also critical that the erector does not damage the members during installation and protects them until erection is complete.**

#### 3.2 Commissioning

- A. N/A

END OF SECTION 03 41 00

SECTION 03 45 00

PRECAST ARCHITECTURAL CONCRETE

1.1 SCOPE

- A. This section covers precast architectural concrete including but not limited to:
  - 1. Façade panels at the Community Space
  - 2. Exterior feature stairs at the Community Space
  - 3. Exterior Cladding panels at select areas of the Parking Garage
- B. This section does not cover Precast Structural Concrete that makes up the majority of the Parking Garage Structure. For Precast Structural Concrete see section 03 41 00.

1.2 QUALITY ASSURANCE

- A. Installer: PCI-certified erector.
- B. Fabricator: PCI-certified plant.
- C. Quality-Control Standard: PCI MNL 117.
- D. Sample panels for each finish, color, and texture variation.
- E. Mockups.
- F. Preconstruction testing mockup.

1.3 SUSTAINABILITY REQUIREMENTS

- A. LEED v4:
  - 1. Recycled content if/as necessary to meet project LEED goals per RFP.
  - 2. Regional materials if/as necessary to meet project LEED goals per RFP

1.4 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Fabricator to design architectural precast concrete units.
  - 1. Dead Loads: As determined by applicable governing codes.
  - 2. Live Loads: As determined by applicable governing codes.



3. Wind Loads: As determined by applicable governing codes.
4. Seismic Loads: As determined by applicable governing codes.

## 1.5 MATERIALS

### A. Reinforcing Materials:

1. Reinforcing Bars:
2. Steel Bar Mats:
3. Welded Wire Reinforcement:

### B. Prestressing tendons.

### C. Concrete Materials:

1. Portland Cement: ASTM C150/C150M, Type I or Type III.
2. Supplementary Cementitious Materials: T.B.D.
3. Aggregates: T.B.D.

- a. Face-Mixture Coarse Aggregates: Grading T.B.D..

4. Coloring admixture.
5. Admixtures: TBD

### D. Steel Connections: Galvanized or Painted.

### E. Stainless steel connections.

### F. Bearing Pads

### G. Grout

## 1.6 CONCRETE MIXTURES

### A. Compressive Strength (28 Days):

1. Normal-Weight Concrete Face and Backup Mixtures: [5000 psi (34.5 MPa) minimum..
2. Lightweight Concrete Backup Mixtures: [5000 psi (34.5 MPa)] minimum

## 1.7 SOURCE QUALITY CONTROL

- A. Testing Agency: [**Owner**] [**Contractor**] engaged to evaluate fabricator's quality-control and testing methods.



- 1.8 FIELD QUALITY CONTROL
- A. Special Inspections: Owner engaged.
  - B. Testing Agency: Owner engaged.

END OF SECTION 03 45 00



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

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SECTION 04 22 00

CONCRETE UNIT MASONRY

1.1 SCOPE

- A. CMU for interior and exterior non-bearing wall and partition construction

1.2 QUALITY ASSURANCE

- A. Typical submittal process.

1.3 SUSTAINABILITY REQUIREMENTS

- A. LEED v4
  - 1. Regional materials.

1.4 PERFORMANCE REQUIREMENTS

- A. Determine net-area compressive strength of masonry by unit-strength method.
- B. Meet seismic and wind loads requirements of 2014 NYCBC.
- C. Must comply to UL rated assemblies

1.5 MATERIALS

- A. Concrete Masonry Units (CMUs):
  - 1. Units made with integral water repellent for CMU exposed to exterior and exposed to building separation gap against Garage.
  - 2. CMUs: Normal weight.
- B. Reinforcing Steel: Uncoated-steel reinforcing bars.
- C. Masonry-Joint Reinforcement:
  - 1. Interior Walls: galvanized, carbon steel.
  - 2. Exterior Walls: galvanized, carbon steel.
- D. Ties and Anchors: Galvanized steel.
  - 1. Adjustable anchors for connecting to structural steel framing.



2. Adjustable anchors for connecting to concrete.
3. Partition top anchors.
4. Rigid anchors.

E. Embedded Flashing:

1. All Flashing: Stainless steel.
2. Single-Wythe CMU Flashing System: Polyethylene flashing pans and interlocking web covers.

F. Reinforcing bar positioners.

G. Masonry-Cell Fill: lightweight aggregate.

H. Mortar:

1. Portland cement-lime mortar unless otherwise indicated.

1.6 FIELD QUALITY CONTROL

- A. Testing Agency: Owner engaged.
- B. Inspections: Special inspections according to 2014 NYCBC.

END OF SECTION 04 22 00

SECTION 04 43 13.13

ANCHORED STONE MASONRY VENEER

1.1 SCOPE

- A. Exterior stone veneer around the base of the Community Center

1.2 QUALITY ASSURANCE

- A. Mockups.

1.3 SUSTAINABILITY REQUIREMENTS

- A. LEED v4:
  - 1. Regional materials.

1.4 MATERIALS

- A. Stone Type 1 - granite
  - 1. Match Architect's samples for color, finish, and aesthetic effects.
- B. Veneer Anchors: Stainless steel.
- C. Stone Trim Anchors: Stainless steel.
- D. Embedded Flashing:
  - 1. All Flashing: Stainless steel].
- E. Asphalt damp proofing for concrete and unit masonry backup.
- F. Weep Holes/Vents: rectangular plastic tubing.
- G. Cavity drainage material.
- H. Mortar:
  - 1. Setting Mortar: Pigmented.
  - 2. Pointing Mortar: Pigmented.



- I. Stone Fabrication:
  - 1. Thickness: 2"
  - 2. Finish: As indicated.

## 1.5 INSTALLATION

- A. Pattern:
  - 1. Large pieces per elevation.
- B. Joints:
  - 1. Minimum Width: 1/4 inch
  - 2. Maximum Width: 1/2 inch
  - 3. Profile: Raked.
- C. Anchored Stone Masonry:
  - 1. Anchored to Concrete: Anchored with corrugated-metal seismic veneer anchors.
  - 2. Anchored to Unit Masonry: Anchored with corrugated-metal seismic veneer anchors.
- D. Recycle clean masonry waste as fill material.

END OF SECTION 044313.13

SECTION 05 12 00

STRUCTURAL STEEL

PART 1 - GENERAL

1.1 GENERAL

Work of this Section shall conform to requirements of Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections.

1.2 SCOPE

The work covered by this Section shall include all labor, material, equipment, permits, engineering and other services necessary for the fabrication and installation of structural steel and related work, complete, in accordance with the Drawings and as specified herein.

1.3 RELATED WORK SPECIFIED IN OTHER SECTIONS

Submittals	Division 1 as provided by DDC
Quality Control	Division 1 as provided by DDC
Quality Assurance: Structural Testing and Inspection	Section 014500
Concrete Reinforcement and Embedded Assemblies	Section 032000
Cast-In-Place Concrete	Section 033000
Steel Deck	Section 053000
Miscellaneous Metals	Division 5
Fireproofing	Division 7
Painting	Division 9
Elevators	Division 14

1.4 CODES AND STANDARDS

- A. Building Code: Structural steel work shall conform to the requirements of the Building Code identified on the Structural General Notes, and OSHA requirements, except where more stringent conditions or criteria occur in the standards referenced below and on the Drawings.
- B. Standards:



1. American Institute of Steel Construction (ANSI/AISC 360) "Specification for Structural Steel Buildings" per Structural General Notes.
2. ANSI/AISC 341 and 341s1- Seismic Provisions for Structural Steel Buildings, Including Supplement No. 1; American Institute of Steel Construction, Inc.
  - a) Item Q3.3 shall be deleted, and replaced by the requirements of the project Specification.
3. American Institute of Steel Construction (AISC 303), "Code of Standard Practice" (COSP). Due to potential conflicts between the governing contracts and parts of Section 1 through 5 of the COSP, Sections 1 through 5 are excluded from these Contract Documents. Prior to bid, the Owner and Contractor, in consultation with the Design Professionals, can discuss and determine if any excluded provisions are appropriate to include in the Contract Documents.
4. Research Council on Structural Connections (RCSC) - "Specification for Structural Joints Using High Strength Bolts".
5. American Society for Testing and Materials "ASTM Standards in Building Codes", various standards as referenced herein.
6. The Society for Protective Coatings (formerly Steel Structures Painting Council, "SSPC") "Steel Structures Painting Manual".

## 1.5 CONTRACTOR QUALIFICATIONS

- A. Qualification Data: Submit for record qualification data (personnel and firm resumes, and project lists with references) for the Structural Steel Fabricator ("Fabricator"), Structural Steel Detailer ("Detailer"), Contractor's Engineer(s) and Structural Steel Erector ("Erector").
- B. The Fabricator shall have 10 years of comparable experience in installations of this type and shall employ labor and supervisory personnel familiar with the type of installation, experienced in fabrication and erection of structural steel for projects of similar size and complexity. At the time of bid the Fabricator shall be AISC certified to the Standard for Steel Building Structures (BU) and must submit proof of these qualifications. The Fabricator's qualifications shall be subject to review by the Design Professionals and Owner.
- C. The Detailer shall have 10 years experience preparing detailed steel shop drawings and CNC downloads for structures of this type and complexity. The detailer's qualifications shall be subject to review by the Design Professionals and Owner. All detailing shall be performed with 3D modeling software, such as TEKLA STRUCTURES, SDS-II or equivalent. Model shall be maintained to be current throughout the construction and in a form useable by the Design Professionals.



## 1.6 TEMPORARY SUPPORT OF STRUCTURAL STEEL FRAME

The structure as shown on the Contract Documents is designed to withstand the design loads only when all structural elements are installed and fully connected. The contractor shall be responsible for the analysis of all components and assemblies for stresses and displacements that may be imposed by fabrication, shipping, handling, erection, temporary conditions, construction loads, etc. The analysis of such shall be performed by the Contractor's Engineer.

## 1.7 CONNECTION DESIGN AND DETAILING CONFERENCE

- A. At least 20 working days prior to starting connection design and detailing, the Fabricator shall hold a meeting to verify all connection design assumptions and procedures and shop drawing preparation and submittal procedures.

## 1.8 DESIGN OF CONNECTIONS

- A. The contractor is responsible to design all connections not completely designed on the Contract Documents. A Completely Designed connection is only one that is specifically designated as such by the statement "COMPLETELY DESIGNED" on the Contract Documents. All connections not indicated as "COMPLETELY DESIGNED" shall be designed for the forces and/or connection design criteria called for in the Contract Documents.

## 1.9 STRUCTURAL STEEL PRE-ERECTION CONFERENCE:

- A. At least twenty (20) working days prior to the commencing of steel erection the Contractor shall hold a meeting to review the detailed requirements of the steel erection.

## 1.10 QUALITY ASSURANCE BY OWNER'S TESTING AGENCY

- A. See Section 014500.

## PART 2 - PRODUCTS

### 2.1 STRUCTURAL STEEL

- A. Structural steel shall conform to the requirements listed on the Structural General Notes.



- B. "Heavy Sections" as defined in this Specification require minimum Charpy impact values per the Structural General Notes, in addition to any other members stated in the Notes.

## 2.2 SHOP COATINGS

- A. Standard Primer: Rust inhibitive, universal phenolic alkyd metal primer 2-4mls. Color to be determined by Architect. Primer shall be compatible with, and from the same manufacturer as, top coats specified in Division 9 specification.
- B. Zinc Rich Primer: SSPC-Paint 20, Type I or Type II, Zinc rich primer utilizing either an organic or inorganic binder with a minimum zinc content of 80 percent by weight in the dry film. The primer shall provide a surface meeting AISC Slip Critical Class B (slip coefficient =0.50 min) requirements. Color to be determined by Architect. Primer shall be compatible with, and from the same manufacturer as, top coats specified in Division 9 specification.
- C. Hot Dip Galvanizing: ASTM A123, weight of coating shall average not less than 2.3 oz per square foot (0.70 kg/ m<sup>2</sup>), with no individual thickness less than 2.0 oz per square foot (0.61 kg/m<sup>2</sup>).
- D. Galvanizing Repair Paint: ZRC Cold Galvanizing Compound, or other coating complying with SSPC-Paint 20.

## 2.3 ACCESSORIES

- A. High Strength Bolts: Conform to the provisions of the Research Council on Structural Connections (RCSC) "Specification for Structural Joints Using High-Strength Bolts" except that nuts shall be ASTM A563 Grades DH or DH3 (hardened) for both A325 and A490 bolts. Twist off type bolts (Tension Control bolts) shall additionally conform to ASTM F1852 or ASTM F2280.
- B. All bolts shall be new, and not re-used.
- C. Where A325 galvanized bolts nuts and washers are required, they shall be in accordance with ASTM F2329 and ASTM A153, Class C. Where A588 steel is used, bolts, nuts and washers shall be Type 3.





## 2.4 LEED REQUIREMENTS

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. **Work by Others:** Examine all work prepared by others to receive work of this Section and report any defects affecting installation to Design Professionals. Commencement of work will be construed as complete acceptance of preparatory work by others. The Contractor alone shall be responsible for checking the dimensions and coordination of the structural steel work with other trades.

### 3.2 FABRICATION

- A. Fabricate and assemble structural steel in the shop to the greatest extent possible.

### 3.3 ERECTION

- A. **Tolerances:** Erect all work plumb, square and true to lines and levels in strict accordance with the structural requirements of the building within tolerances of the AISC Code of Standard Practice, unless otherwise indicated on the Contract Documents. Compensate for the difference between the temperature at time of erection and the mean temperature in service.

### 3.4 CORRECTIVE MEASURES

- A. **Conflicts:** The Contractor shall be solely responsible for errors of detailing, fabrication, and erection of structural steel, and steel deck.

END OF SECTION 05 12 00



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

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SECTION 05 30 00

STEEL DECK

PART 1 - GENERAL

1.1 GENERAL

Work of this Section shall conform to the requirements of Drawings and general provisions of the Contract, including General Conditions, Supplementary General Conditions and Division 1 Specification sections.

1.2 SCOPE

The work covered by this Section shall include all labor, material, equipment, permits, engineering and other services necessary for the design and installation of composite and non-composite structural steel floor deck systems, steel roof deck systems and related work with all attachments, flashings, metal closures, concrete stops, accessories and fittings as required for a complete installation in accordance with the Drawings and as specified herein.

1.3 RELATED WORK SPECIFIED IN OTHER SECTIONS

Submittals	Division 1 as provided by DDC
Quality Control	Division 1 as provided by DDC
Quality Assurance: Structural Testing and Inspection	Section 014500
Concrete	Section 033000
Structural Steel	Section 051200
Miscellaneous Metals	Division 5
Fireproofing	Division 7
Painting	Division 9

1.4 CODES AND STANDARDS

A. Building Code: Steel deck work shall conform to the requirements of the Building Code identified on the Structural General Notes, and OSHA requirements, except where more stringent conditions or criteria occur in the standards referenced below and on the Drawings.

B. Standards:



1. All steel floor and roof deck manufacturers shall be listed in the Underwriter's Laboratories "Fire Resistance Index of Companies".
2. American Iron and Steel Institute (AISI) "Specification for the Design of Cold-Formed Steel Structural Members".
3. American Welding Society AWS D1.3 , "Structural Welding Code – Sheet Steel."
4. American Society for Testing and Materials "ASTM Standards in Building Codes", various standards as referenced herein.
5. Steel Deck Institute (SDI) "Design Manual for Composite Decks, Form Decks and Roof Decks".

## 1.5 STEEL DECK MANUFACTURER AND CONTRACTOR QUALIFICATIONS

- A. The Manufacturer and the Steel Deck Erector ("Erector") shall each demonstrate a minimum of ten (10) years of experience with the specified steel deck systems.
- B. The Erector shall use prequalified welding processes in accordance with the AWS Structural Welding Code and shall provide certification that those welders to be employed in the Work are currently qualified for those processes and have satisfactorily passed the applicable AWS qualification tests.
- C. Contractor's Engineer shall be qualified to perform the type of work required by the project. The Engineer shall be a Professional Engineer licensed in the state where the project is located. The Contractor's Engineer shall have 10 years of experience in responsible charge of work of this nature, on steel deck installations similar to this Project in material, design, and extent, with a record of successful in-service performance. Proposed Contractor's Engineer shall be subject to approval of Design Professionals and Owner. The Engineer shall be a Professional Engineer licensed in the state where the project is located.

## PART 2 - PRODUCTS

### 2.1 GENERAL

The work specified herein is based on the products of Vulcraft, in order to establish design quality and function in the installed work. Products of other manufacturers shall be subject to the approval of the Design Professionals. All steel deck units shall be of the same depth and profile as shown on the Drawings and the product of one manufacturer.

### 2.2 DESIGN

- A. Section properties of the steel deck units shall be calculated in accordance with the AISI "Specification for the Design of Cold-Formed Steel Structural Members". The minimum positive



and negative section moduli so obtained shall be used in calculations involving positive and negative moments, respectively, in determining the required gauges of steel deck units.

B. Design of steel deck not receiving concrete fill:

1. Resist design loads using bare steel deck properties. Consider both construction loads and specified loads.
2. Use three span continuous layouts wherever possible.

C. Design of steel deck to receive concrete fill:

1. Design to work compositely with the concrete fill, unless otherwise specifically noted in the Contract Documents as 'form deck.'
2. Assume deck acts with hardened concrete in a simple-span mode unless otherwise specifically noted on the Contract Documents.

## 2.3 MATERIALS

A. Composite Steel Floor Deck

1. Galvanized Steel Deck: shall be formed from steel sheets conforming to ASTM A653, Structural Quality Grade 33 (minimum) with minimum yield strength of 33 ksi (230MPa). Before forming, the steel sheet shall be zinc coated conforming to ASTM A924, G60.

## 2.4 ACCESSORIES

- A. General: Provide accessory materials for steel deck that comply with requirements indicated and recommendations of the steel deck manufacturer.

## 2.5 SIDE JOINT HANGER SYSTEM FOR USE IN COMPOSITE STEEL FLOOR DECK ONLY

- A. No mechanical, electrical, plumbing or fire protection loads shall be hung from deck side joint hanger tabs.



## 2.6 LEED REQUIREMENTS

### PART 3 - EXECUTION

#### 3.1 ERECTION – PLACEMENT

- A. Erect steel deck in accordance with the decking manufacturer's recommendations and the requirements of the Drawings and these Specifications.
- B. Place steel deck on the supporting framework and adjust to final position with ends accurately aligned and bearing on supporting members before making permanent connections. Do not stretch or contract sidelap interlocks.

#### 3.2 ERECTION - CONNECTIONS

- A. Connect steel deck to the steel framework at ends of units and at intermediate supports as shown on the Contract Documents and approved shop drawings.
- B. Deck to support welds shall be puddle welds of diameter and spacing shown on Contract Documents and/or approved shop drawings.
- C. Where headed studs occur, if fused to deck for full weld perimeter each headed stud may be considered to replace one puddle weld

END OF SECTION 05 30 00



SECTION 05 40 00

COLD-FORMED METAL FRAMING

- 1.1 Metal framing system for exterior rainscreen and window wall assembly
- 1.2 SUSTAINABILITY REQUIREMENTS
  - A. LEED v4:
    - 1. Recycled content.
- 1.3 QUALITY ASSURANCE
  - A. Code-compliance certification of studs and tracks by the Certified Steel Stud Association, the Steel Framing Industry Association, or the Steel Stud Manufacturers Association.
- 1.4 PERFORMANCE REQUIREMENTS
  - A. Delegated Design: For cold-formed steel framing.
- 1.5 MATERIALS
  - A. Steel Sheet: ASTM A1003/A1003M, Structural Grade, and metallic coating.
  - B. Exterior Non-Load-Bearing Wall Framing: Standard C-shaped, punched steel studs and U-shaped, unpunched track.
    - 1. Per delegated design
  - C. Framing Accessories: Supplementary framing, Bracing, bridging, and solid blocking, Stud kickers and knee braces.
- 1.6 INSTALLATION
  - A. Fasten framing by welding or screw fastening.
    - 1. Exterior Non-Load-Bearing Wall Stud Spacing: as per delegated design
    - 2. Interior Non-Load-Bearing Wall Stud Spacing: 16" O.C. UON



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

1.7 FIELD QUALITY CONTROL

- A. Testing: By owner-engaged agency.

END OF SECTION 05 40 00





SECTION 05 50 00

METAL FABRICATIONS

1.1 SCOPE

- A. Miscellaneous metal scope for Community Center

1.2 SUSTAINABILITY REQUIREMENTS

- A. LEED v4:
  - 1. Recycled content.
  - 2. Environmental product declaration.
  - 3. Product certificates.

1.3 PRODUCTS

- A. Materials: Steel plates, shapes, and bars, Stainless steel plates, shapes, and bars, Steel tubing, Steel pipe, Slotted channel framing, Iron castings, Aluminum, Bronze, Nickel silver.
- B. Miscellaneous Framing and Supports: Galvanized or Primed using zinc-rich primer where indicated.
  - 1. Steel framing and supports for applications where framing and supports are not specified in other Sections.
- C. Shelf angles at exterior walls: galvanized.
- D. Metal Ladders (Including Elevator Pit Ladders): Steel.
- E. Ladder Safety Cages:
- F. Metal Ships' Ladders: Steel.
- G. Metal Floor Plate:
- H. Elevator pit sump covers.
- I. Structural-Steel Door Frames:
- J. Miscellaneous Steel Trim:
- K. Metal Bollards:
- L. Vehicular barrier cable systems, including design.



- M. Pipe and Downspout guards.
- N. Abrasive Metal Nosings, Thresholds: Extruded aluminum.
- O. Cast-iron wheel guards:
- P. Loose bearing and leveling plates: primed using zinc-rich primer.
- Q. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts cast into concrete or built into unit masonry.
- R. Steel weld plates and angles not specified in other Sections, for casting into concrete.

END OF SECTION 05 50 00



SECTION 05 51 13

METAL PAN STAIRS

1.1 SCOPE

- A. Metal Pan stair system for Community Center egress.

1.2 SUSTAINABILITY REQUIREMENTS

- A. LEED v4:
  - 1. Recycled content.
  - 2. Regional materials.

1.3 SUMMARY

- A. Preassembled steel stairs with concrete-filled treads.
- B. Steel railings and guards attached to metal stairs.
- C. Steel handrails attached to walls adjacent to metal stairs.
- D. Railing gates at the level of exit discharge.

1.4 PERFORMANCE REQUIREMENTS

- A. Engineering design of steel stairs, railings, and guards] by Contractor.

1.5 MATERIALS

- A. Abrasive Nosings: Cast aluminum

1.6 STEEL-FRAMED STAIRS

- A. Stair Standard: NAAMM AMP 510, "Metal Stairs Manual," Architectural Class.
- B. Stringers: Steel channels.
- C. Metal Pan Stairs: steel sheet.
- D. Steel Tube Railings and Guards:



1. Rails and Posts: round or square
2. Expanded-Metal Infill: Expanded-metal panels edged with U-shaped channels made from steel sheet.
3. Perforated-Metal Infill: Perforated-metal panels edged with U-shaped channels made from metal sheet.
4. Mesh Infill: Woven-wire mesh crimped into steel channel frames.

END OF SECTION 05 5113

SECTION 05 73 00

DECORATIVE METAL RAILINGS

1.1 SCOPE

- A. Handrail and guard system for monumental stairs at Community Center.

1.2 SUMMARY

- A. Stainless steel decorative railings with stainless steel, wire-rope guard infill.
- B. Illuminated decorative railings.

1.3 QUALITY ASSURANCE

- A. Contractor to engineer railings to withstand structural loads.
- B. Mockups for each form and finish of railing.

1.4 SUSTAINABILITY REQUIREMENTS

- A. LEED v4:
  - 1. Recycled content.
  - 2. Certified wood.

1.5 MATERIALS

- A. Stainless Steel: Type 316L.

1.6 FABRICATION

- A. Connections: Welded, Mechanical.
- B. Changes in Direction of Members: By bending or by inserting prefabricated fittings.
- C. Infill Panels:
  - 1. Expanded Metal: Stainless steel.
  - 2. Perforated Metal: Stainless steel.
  - 3. Woven-Wire Mesh: Stainless steel



D. Toe boards.

1.7 FINISHES

A. Stainless Steel Tubing: 180-grit polished

B. Stainless Steel Sheet and Plate: ASTM A480/A480M No. 4.

1.8 FIELD QUALITY CONTROL

END OF SECTION 05 73 00



SECTION 05 77 00

DECORATIVE EXTRUDED METAL FIN SCREENS

1.1 SUMMARY

- A. Decorative Metal Products:
  - 1. Decorative extruded metal screens for exterior of the Parking Garage.

1.2 PERFORMANCE REQUIREMENTS

- A. Decorative extruded metal screens shall be designed to handle wind, seismic and impact loads.

1.3 QUALITY ASSURANCE

- A. Shop drawings and structural calculations.
- B. Sample of each fin profile, bracket type, finish and color.
- C. Mockups for each type of decorative extruded metal screen installation including fins, brackets, anchorage and accessories.

1.4 SUSTAINABILITY REQUIREMENTS

- A. LEED v4
  - 1. Recycled content.

1.5 MATERIALS

- A. Fins end caps and, brackets: Aluminum
- B. Exposed fasters: Stainless Steel.
- C. Accessories: Stainless steel bird spikes where required.

1.6 FINISHES

- A. Aluminum: Two-coat fluoropolymer

END OF SECTION 05 77 00



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

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SECTION 06 10 00

ROUGH CARPENTRY

1.1 SCOPE

- A. Interior and Exterior wood blocking.

1.2 SUSTAINABILITY REQUIREMENTS

- A. LEED v4:
  - 1. Regional materials.
  - 2. Certified wood.
  - 3. Low-emitting composite wood products.
  - 4. Low-emitting adhesives.

1.3 MATERIALS

- A. Wood Products, General:
  - 1. Maximum Moisture Content of Lumber: 15 percent
- B. Wood-Preservative-Treated Lumber:
  - 1. Preservative Treatment: AWPA U1; Use Category UC2, but Use Category UC3b for exterior construction and Use Category UC4a for items in contact with ground.
    - a. Preservative Chemicals: Containing no arsenic or chromium.
  - 2. Application:
    - a. Items in contact with roofing or waterproofing.
    - b. Items in contact with concrete or masonry.
- C. Fire-Retardant-Treated Materials:
  - 1. Exterior type for exterior locations and where indicated.
  - 2. Interior Type A, High Temperature (HT) for enclosed roof framing, framing in attic spaces, and where indicated.
  - 3. Interior Type A unless otherwise indicated.
  - 4. Application:
    - a. Concealed blocking.
    - b. Plywood backing panels.



- D. Fasteners: Hot-dip galvanized steel where exposed to weather, in ground contact, in contact with treated wood, or in area of high relative humidity.

END OF SECTION 06 10 00



SECTION 06 16 00

SHEATHING

- 1.1 Exterior sheathing for Community Center rainscreen system
  
- 1.2 SUSTAINABILITY REQUIREMENTS
  - A. LEED v4:
    - 1. Low-emitting adhesives.
  
- 1.3 MATERIALS
  - A. Wall Sheathing:
    - 1. Glass-Mat Gypsum: Regular, 1/2-inch, Type X, 5/8 inch (15.9 mm) thick.
  - B. Roof Sheathing:
    - 1. Oriented Strand Board: Structural I 3/4 inch
  - C. Parapet Sheathing:
    - 1. Glass-Mat Gypsum: Regular, 1/2-inch, Type X, 5/8 inch thick.
  - D. Fasteners: Hot-dip galvanized steel where exposed to weather, in ground contact, in contact with treated wood, or in area of high relative humidity.
  - E. Miscellaneous Materials:
    - 1. Sealant for gypsum sheathing.
    - 2. Sheathing tape.
  
- 1.4 INSTALLATION
  - A. Sheathing:
    - 1. Screw to cold-formed metal framing.

END OF SECTION 061600



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

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SECTION 07 11 13

BITUMINOUS DAMP-PROOFING

- 1.1 Bituminous Damp Proofing for accessible foundation wall.
  
- 1.2 MATERIALS
  - A. Cold-applied, cut-back asphalt.
  - B. Cold-applied, emulsified asphalt.
  - C. Primer: Emulsified asphalt.
  - D. Protection Course: Extruded-polystyrene board insulation.
  - E. Molded-Sheet Drainage Panels:
  
- 1.3 INSTALLATION
  - A. Cold-Applied, Emulsified-Asphalt Damp-Proofing:
    - 1. Concrete Foundations and Parged Masonry Foundation Walls: Two brush or spray coats one fibered brush or spray coat or one trowel coat.
    - 2. Unparged Masonry Foundation Walls: Primer and two brush or spray coats, primer and one fibered brush or spray coat, or primer and one trowel coat].
    - 3. Unexposed Faces of Concrete Retaining Walls: One brush or spray coat.
    - 4. Unexposed Faces of Masonry Retaining Walls: Primer and one brush or spray coat.
    - 5. Concrete Backup for Stone Veneer Assemblies and Dimension Stone Cladding: One brush or spray coat.
    - 6. Masonry Backup for Stone Veneer Assemblies and Dimension Stone Cladding: Primer and one brush or spray coat.
    - 7. Exterior Face of Inner Wythe of Cavity Walls: Primer and one brush or spray coat.
    - 8. Interior Face of Exterior Concrete Walls: One brush or spray coat.

END OF SECTION 07 11 13



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

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SECTION 07 13 26

SELF-ADHERING SHEET WATERPROOFING

1.1 SCOPE

- A. Blind side waterproofing for foundation work

1.2 QUALITY ASSURANCE

- A. Mockups for each type of waterproofing

1.3 WARRANTY

- A. Manufacturer's Warranty:
- B. Installer's Warranty:

1.4 MATERIALS

- A. Sheet Waterproofing: blindside sheet waterproofing for vertical applications
- B. Auxiliary Materials:
  - 1. Primer: water or solvent borne.
  - 2. Metal Termination Bars: Aluminum.
  - 3. Protection Course: Extruded-polystyrene board insulation
- C. Molded-Sheet Drainage Panels: Molded-plastic drainage core with a woven geotextile facing.

1.5 INSTALLATION

- A. Blind side sheet application.

1.6 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor engaged.
- B. Inspections by manufacturer's full-time site representative.

END OF SECTION 07 13 26



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

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SECTION 07 18 00

TRAFFIC MEMBRANE

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Furnish all the labor, materials, equipment, and incidentals necessary to install traffic membranes. The traffic membrane system shall be a complete system of compatible materials supplied by traffic membrane manufacturer to create a seamless waterproof membrane.
- B. Work shall be covered by a five (5) year material and labor warranty.

**1.2 QUALITY ASSURANCE**

- A. Codes and Standards: Comply with provisions of the following, except as otherwise indicated:
  - 1. ICRI Guidelines No. 03732 "Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays."
  - 2. "Code of Federal Regulations, Part 1926" per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).
  - 3. ACI 308: Standard Practice for Curing Concrete
- B. Contractor qualifications: Qualified to perform work specified by reason of experience or training provided by product manufacturer.

**1.3 SUSTAINABILITY REQUIREMENTS**

- A. Reference specification section 01 81 13.

**PART 2 - PRODUCTS**

**2.1 PRODUCT**

- A. Compliance: ASTM C957
- B. Vehicular Traffic Coating Material
  - 1. Primer: Concrete and metal primers as required by the manufacturer.
  - 2. Flashing and Reinforcing Tape: As required by the manufacturer.
  - 3. Liquid Flashing: As required by the manufacturer.
  - 4. Aggregate: Silica (quartz) sand 30-50 mesh size or other aggregate approved by the traffic membrane manufacturer.
  - 5. Elastomeric Base Coat: neoprene coating.
  - 6. Wearing Course(s): high solids epoxy wear course.
  - 7. Topcoat: acrylic UV coating.
  - 8. Sealant: Polyurethane sealant approved by the manufacturer.
- C. Manufacturers
  - 1. NeoGard
  - 2. Kelmar
  - 3. Sika
  - 4. Approved equal



**PART 3 - EXECUTION**

**3.1 GENERAL EXECUTION REQUIREMENTS**

- A. **Cleaning:** Surfaces contaminated with oil or grease shall be vigorously scrubbed with a power broom and a strong non-sudsing detergent. Thoroughly wash, clean, and dry. Areas where oil or other contaminants penetrate deep into the concrete may require removal by mechanical methods.
- B. **Shot Blasting:** Is the preferred method for new construction. Mechanically prepare surface by shot blasting to industry standard surface texture (ICRI's CSP3-4) without causing additional surface defects in deck surface. Shot blasting does not remove deep penetrating oils, grease, tar or asphalt stains. Proper cleaning procedures should be followed to insure proper bonding of the deck coating.
- C. **Installation to conform to manufacturers recommendations.**

**3.2 COMMISSIONING**

- A. **N/A**

END OF SECTION 07 18 00



SECTION 07 19 00  
CONCRETE SEALER

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide clear water repellent treatment for exposed horizontal surfaces of precast parking deck not to be coated with any other material. of special color and texture concrete masonry construction. Products installed, but not furnished, under this Section:
- B. Quality Assurance
  - 1. Qualification of Manufacturer: Firm with minimum five years record of successful inservice experience of clear water repellent treatments manufactured for concrete masonry unit application.
  - 2. Qualification of Installers: Applicator with minimum five years successful experience in projects of similar scope using specified or similar treatment materials and approved by treatment manufacturer.
  - 3. Regulatory Requirements: Provide materials with not more than the maximum volatile organic compounds (VOC) as required by applicable authorities.
- C. List any relevant requirements specific to the project of the RFP

1.2 SUSTAINABILITY REQUIREMENTS

- A. Reference specification section 01 81 13.

PART 2 - PRODUCTS

2.1 PRODUCTS

- A. Provide a penetrating, clear, non-staining sealer.

2.2 PERFORMANCE REQUIREMENTS

- A. Increase concrete surface density.
- B. Dust-proofed
- C. Resist tire marks.
- D. Slip resistant finish.
- E. Compatibility: Provide products which are recommended by manufacturer to be fully compatible with indicated substrates and joint sealers which are in contact with water repellent treatment.
- F. Appearance: Clear, non-yellowing water repellent treatment shall not alter appearance, color, or texture of substrate under any lighting conditions.



### PART 3 - EXECUTION

#### 3.1 GENERAL EXECUTION REQUIREMENTS

- A. Coordinate application with with striping.
- B. Surface Preparation: Prepare substrates in accordance with water repellent treatment manufacturer's recommendations.
  - 1. Clean surfaces of dust, dirt and foreign matter detrimental to proper installation of water repellent treatment.
- C. Application: Apply treatment in accordance with clear water repellent treatment manufacturer's instructions and applicable recommendations, including number of coats, maximum allowable coverage, and equipment.
  - 1. Review procedures used for application of treatment to mock-up and recommendations for changes needed based on water penetration tests conducted on mock-up
  - 2. Consult with manufacturer's representative for site inspections, for proper application techniques not fully covered in manufacturer instructions, and for applicable recommendations.

#### 3.2 COMMISSIONING

- A. N/A

END OF SECTION 07 19 00



SECTION 07 21 19

FOAMED-IN-PLACE INSULATION

1.1 SCOPE

- A. Spray insulation for West wall of parking garage

1.2 MATERIALS

- A. Closed-Cell Spray Polyurethane Foam: Type II, minimum density of 1.5 lb/cu. ft.

END OF SECTION 07 21 19



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

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SECTION 07 26 00

VAPOR RETARDERS

1.1 SCOPE

- A. Below slab vapor barrier for Parking Garage and Community Center

1.2 MATERIALS

- A. Reinforced-Polyethylene Class A Vapor Retarders
  - 1. 10 Mil. Thickness
  - 2. 46 lb/1000 sq. ft. Minimum.
  - 3. Puncture Resistance: 40 lb. minimum; ASTM E154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover per RFP requirements

END OF SECTION 07 26 00



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

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SECTION 07 27 26

FLUID-APPLIED MEMBRANE AIR BARRIERS

1.1 SCOPE

- A. Air/water barrier for exterior wall construction at Community Space and any other places of the exterior envelope as shown on the drawings.

1.2 QUALITY ASSURANCE

- A. Installer Qualifications: Trained and approved by manufacturer and ABAA certified.
- B. Mockups of wall assembly for preconstruction testing.

1.3 SUSTAINABILITY REQUIREMENTS

- A. LEED v4.
  - 1. Low-emitting coatings.

1.4 PRECONSTRUCTION TESTING

- A. Mockup testing for air leakage locations, air leakage volume, and adhesion.

1.5 PERFORMANCE REQUIREMENTS

- A. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft.

1.6 AIR-BARRIER MEMBRANES

- A. High-Build Air Barrier: Vapor-retarding, Vapor-permeable, modified bituminous, and synthetic polymer type per application.
- B. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft.
- C. Vapor Permeance (per condition):
  - 1. Vapor-Retarding Type: Maximum Class I
  - 2. Vapor-Permeable Type: Minimum Class III.
- D. Fire Propagation Characteristics: Passes NFPA 285.



- E. UV Resistance: Can be exposed to sunlight for 180 days.

1.7 FIELD QUALITY CONTROL

- A. ABAA Quality Assurance Program.
- B. Testing and Inspecting: By Owner-engaged agency for air-leakage locations, air-leakage volume, and adhesion.

END OF SECTION 07 27 26

SECTION 07 42 13.13

FORMED METAL WALL PANELS

- 1.1 SCOPE
  - A. Rainscreen metal panels for Exterior Walls of Community Center
  
- 1.2 QUALITY ASSURANCE
  - A. Portable roll-forming equipment allowed.
  - B. Mockups.
  
- 1.3 SUSTAINABILITY REQUIREMENTS
  - A. LEED v4:
    - 1. Recycled content.
  
- 1.4 WARRANTY
  - A. Special Warranty: Two years.
  - B. Finishes: 20.
  
- 1.5 PERFORMANCE REQUIREMENTS
  - A. Structural Performance: ASTM E1592.
    - 1. Wind Loads: As indicated on Drawings.
    - 2. Other Design Loads:
    - 3. Deflection Limits: 1/180
    - 4. Serviceability Requirements.
  - B. Air Infiltration: ASTM E283.
  - C. Water Penetration: ASTM E331.
  - D. Fire-Resistance Rating: ASTM E119 and UL listed.



1.6 PRODUCTS

- A. Exposed-Fastener, Lap-Seam Metal Wall Panels:
  - 1. Profile: Minimum Gauge, most economical profile.
  - 2. Material: Aluminum or Steel.
  - 3. Exterior Finish: Two-coat fluoropolymer
  
- B. Concealed-Fastener, Lap-Seam Metal Wall Panels:
  - 1. Profile: Reveal joint.
  - 2. Material: Steel or Aluminum sheet.
  - 3. Exterior Finish: Three-coat fluoropolymer.
  
- C. Concealed-Fastener, Lap-Seam Metal Wall Panels:
  - 1. Profile: Corrugated.
  - 2. Material: Steel or Aluminum sheet.
  - 3. Exterior Finish: Three-coat fluoropolymer.
  
- D. Accessories: Flashing and trim.

1.7 FIELD QUALITY CONTROL

- A. Testing: By Contractor-engaged agency.

END OF SECTION 07 42 13.13



SECTION 07 56 00

REINFORCED COLD FLUID APPLIED ROOFING

1.1 SCOPE

- A. Roof system for Community Center roof, including vegetated roof areas, paved areas, and exposed roofing
- B. Roof system for garage bulkhead roofs and any other miscellaneous exposed roofs

1.2 RELATED SECTIONS

- A. 07 72 73 Vegetated Roof Systems

1.3 SUSTAINABILITY REQUIREMENTS

- A. LEED v4:
  - 1. Solar reflectance index.
  - 2. Recycled content.
  - 3. Low-emitting adhesives.
  - 4. Low-emitting sealants.

1.4 PREINSTALLATION MEETINGS

- A. Preliminary roofing and preinstallation roofing conference.

1.5 WARRANTY

- A. Manufacturer's Materials and Workmanship Warranty: 20 years.
- B. Installer's Warranty: Two years.

1.6 PERFORMANCE REQUIREMENTS

- A. Wind Uplift Resistance:
  - 1. Zone 1 (Roof Area Field) Uplift Pressure:
  - 2. Zone 2 (Roof Area Perimeter) Uplift Pressure:
  - 3. Zone 3 (Roof Area Corner) Uplift Pressure:
- B. Cool-Roof Performance: LEED v4.



- C. Exterior Fire-Test Exposure: Class A.

## 1.7 MATERIALS

- A. Listed from bottom up:

1. Vapor Barrier/Temporary Roof- Hot Applied SBS vapor barrier
2. Adhesives
3. Rigid Insulation
4. Cover board
5. Cold Fluid applied membrane options:
  - a. As specified in the RFP: Cold fluid applied reinforced unsaturated polyester roofing system, including mineral broadcast aggregate topcoat, and all related flashings/penetrations.
  - b. Subject to DDC Approval: Fully reinforced cold fluid applied PMMA membrane roof, including all membrane flashings.
  - c. Subject to DDC Approval: Fully reinforced cold fluid applied 2-part polyurethane membrane roof, including all membrane flashings.
6. Walkways

- B. All systems and components noted above must be recommended and warrantied by the manufacturer for vegetated roofs and roofs covered by pavers.

## 1.8 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor engaged.
  1. Electrical capacitance/impedance testing.

END OF SECTION 07 56 00



SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

1.1 SCOPE

- A. Metal flashings for exterior waterproofing conditions at Community Center

1.2 SUSTAINABILITY REQUIREMENTS

- A. LEED v4:
  - 1. Recycled content.

1.3 QUALITY ASSURANCE

- A. Mockups of typical parapet.

1.4 PERFORMANCE REQUIREMENTS

- A. Sheet Metal Standard for Flashing and Trim: SMACNA's "Architectural Sheet Metal Manual"
- B. FM Approvals Listing: For copings.
- C. SPRI Wind Design Standard: For copings according to ANSI/SPRI/FM 4435/ES-1.

1.5 MATERIALS

- A. Sheet Metals:
  - 1. Stainless Steel Sheet, Type 316
  - 2. Metallic-Coated Steel Sheet:
    - a. Coil-Coated Finish: Three-coat fluoropolymer.
- B. Underlayment: Synthetic underlayment.

1.6 PRODUCTS

- A. Manufactured reglets with counterflashing.
- B. Formed Roof-Drainage Fabrications: Including hanging gutters, built-in gutters, downspouts, parapet scuppers, conductor heads, and splash pans.
- C. Formed Wall Fabrications: Including opening flashings in frame construction and wall expansion-joint cover.



- D. Miscellaneous Formed Fabrications: Including equipment support flashing and overhead-piping safety pans.

END OF SECTION 07 62 00





SECTION 07 72 73

VEGETATED ROOF SYSTEMS

1.1 QUALITY ASSURANCE

- A. Installer Qualifications: Approved, authorized, or licensed by membrane roofing manufacturer.

1.2 SUSTAINABILITY REQUIREMENTS

- A. LEED v4:
  - 1. Recycled content.

1.3 WARRANTY

- A. Warranty Period: 20 yrs
- B. Plant Growth:
  - 1. Ground Covers, Perennials, Vines, and Ornamental Grasses:

1.4 PRODUCTS

- A. Vegetated Roof Assembly Type 1
  - 1. Depth: TBD
  - 2. Assembly Weight: Maximum: TBD
  - 3. Plantings: TBD
- B. Manufactured Growing Media:
- C. Walkway Pavers:
  - 1. Walkway Pavers: Concrete.
  - 2. Setting Method: Paver supports.
- D. Geofoam Fill: Extruded-polystyrene board insulation.
- E. Accessories:
  - 1. Access Boxes: Stainless steel.
  - 2. Soil Retainer: Extruded aluminum.



1.5 FIELD QUALITY CONTROL

- A. Electronic leak-detection testing.
- B. Manufacturer's Field Service: Membrane roofing manufacturer's full-time inspection of vegetated roof assembly installation.

1.6 MAINTENANCE SERVICE

- A. Maintenance for 12 months from date of Planting Completion.

END OF SECTION 07 72 73

SECTION 07 81 00

APPLIED FIRE PROTECTION

1.1 SCOPE

- A. Spray fireproofing for superstructure and deck at Community Center

1.2 QUALITY ASSURANCE

- A. Mockups for each type of fire protection, substrate, and finish.

1.3 SUSTAINABILITY REQUIREMENTS

- A. LEED v4:
  - 1. Low-emitting paints and coatings.

1.4 PRECONSTRUCTION TESTING

- A. Testing service engaged by Contractor.

1.5 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Design: Tested according to ASTM E119 or UL 263. Steel members are considered restrained.

1.6 SPRAYED FIRE-RESISTIVE MATERIALS

- A. Sprayed Fire-Resistive Material: Wet, cementitious type for interior:
  - 1. Bond Strength: Minimum 150 lbf/sq. ft and code minimum.
  - 2. Compressive Strength: Minimum 10 lbf/sq. in. and code minimum.
  - 3. Fungus resistant.
  - 4. Sound Absorption:
  - 5. Finish: Spray-textured finish
- B. Auxiliary Materials: According to fire-resistance designs indicated.
  - 1. Sealer.
  - 2. Topcoat: Cement based.



1.7 FIELD QUALITY CONTROL

- A. Special Inspections: Contractor engaged special inspector.

END OF SECTION 07 81 00

SECTION 07 84 13

PENETRATION FIRESTOPPING

1.1 SCOPE

- A. Firestopping for floor and wall penetrations

1.2 QUALITY ASSURANCE

- A. Installer Qualifications: FM Approval approved or UL qualified.

1.3 SUSTAINABILITY REQUIREMENTS

- A. LEED v4:
  - 1. Low-emitting sealants.

1.4 PENETRATION FIRESTOPPING

- A. Penetrations in Fire-Resistance-Rated Walls: F-ratings per ASTM E814 or UL 1479.
- B. Penetrations in Horizontal Assemblies: F-, T-, and W-ratings per ASTM E814 or UL 1479.
- C. Penetrations in Smoke Barriers: L-ratings per UL 1479.

1.5 INSTALLATION

- A. Identification: Walls and penetrations.

1.6 FIELD QUALITY CONTROL

- A. Inspection of Installed Firestopping: By Owner-engaged agency according to ASTM E2174.

END OF SECTION 07 84 13



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

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SECTION 07 84 43

JOINT FIRESTOPPING

- 1.1 SCOPE
  - A. Rated joints at wall/floor intersections.
  
- 1.2 QUALITY ASSURANCE
  - A. Installer Qualifications: FM Approvals approved or UL qualified.
  
- 1.3 SUSTAINABILITY REQUIREMENTS
  - A. LEED v4:
    - 1. Low-emitting sealants.
  
- 1.4 FIRE-RESISTIVE JOINT SYSTEMS
  - A. Joints in or between Fire-Resistance-Rated Construction: ASTM E1966 or UL 2079.
  - B. Joints at Exterior Wall/Floor Intersections: ASTM E119 or ASTM E 2307.
  
- 1.5 FIELD QUALITY CONTROL
  - A. Inspection of Installed Firestopping: By Owner-engaged agency according to ASTM E2393.

END OF SECTION 07 84 43



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

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SECTION 07 92 00

JOINT SEALANTS

1.1 SCOPE

- A. Typical joint sealant: exterior and interior

1.2 PRECONSTRUCTION TESTING

- A. Preconstruction laboratory testing.
- B. Preconstruction field-adhesion testing.
- C. LEED v4:
  - 1. Low-emitting sealants.

1.3 WARRANTY

- A. Installer Warranty: Two.
- B. Special Manufacturer's Warranty: Five years.

1.4 JOINT SEALANTS

- A. Silicone joint sealants.
- B. Non-staining silicone joint sealants.
- C. Urethane joint sealants.
- D. Immersible joint sealants.
- E. Silyl-terminated polyether joint sealants.
- F. Mildew-resistant joint sealants.
- G. Polysulfide joint sealants.
- H. Butyl joint sealants.
- I. Latex joint sealants.
- J. Joint-sealant backing.



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

1.5 FIELD QUALITY CONTROL

A. Field-adhesion testing.

END OF SECTION 07 92 00



SECTION 07 92 10

JOINT SEALANTS FOR PARKING DECK

PART 1 - GENERAL

1.1 SUMMARY

- A. Preparation and installation of all horizontal joint sealants on the parking deck.

1.2 QUALITY ASSURANCE

- A. Installer Qualifications: Company with minimum of **five** years experience specializing in work of this section, employing applicators trained for application of joint sealants required for this project, with record of successful completion of projects of similar scope, and approved by manufacturer. Installer shall be approved or trained by Sealant Manufacturer.
- B. Single Source Responsibility: Provide exterior joint sealants by a single manufacturer responsible for testing of Project substrates to verify compatibility and adhesion of joint sealants.
- C. Special Manufacturer's Warranty: Manufacturer's standard form in which joint sealant manufacturer agrees to furnish joint sealants to repair or replace those that demonstrate deterioration or adhesive or cohesive failure under normal use within warranty period specified.
1. Warranty Period for Sealants: Five years from date of Substantial Completion.
- D. Special Installer's Warranty: Original statement on Installer's letterhead in which Installer agrees to repair or replace joint sealants that demonstrate deterioration or failure within warranty period specified.
1. Warranty Period: 5 years from date of Substantial Completion.

1.3 SUSTAINABILITY REQUIREMENTS

- A. Reference specification section 01 81 13.

PART 2 - PRODUCTS

2.1 PRODUCTS

- A. Immersible, Multi-Component, Pourable, Traffic-Grade Polyurethane Joint Sealant: ASTM C 920, Type M, Grade P, Use T. **Self-leveling sealants are not acceptable.**
- B. Cylindrical Sealant Backing: ASTM C 1330, Type B non-absorbent, bi-cellular material with surface skin, or Type O open-cell polyurethane, as recommended by sealant manufacturer for application.

PART 3 - EXECUTION

3.1 GENERAL EXECUTION REQUIREMENTS

- A. Sealant and Primer Installation Standard: Comply with ASTM C 1193 and manufacturer's written instructions. **Primer is required at all precast joints.**
- B. Joint Backing: Select joint backing materials recommended by sealant manufacturer as compatible with sealant and adjacent materials. Install backing material at depth required to produce profile of joint sealant allowing optimal sealant movement.



1. Install joint backing to maintain the following joint ratios:
  - a. Joints up to 1/2 inch (13 mm) wide: 1:1 width to depth ratio.
  - b. Joints greater than 1/2 inch (13 mm) wide: 2:1 width to depth ratio; maximum 1/2 inch (13 mm) joint depth.
  
- C. Liquid Sealant Application: Install sealants using methods recommended by sealant manufacturer, in depths recommended for application. Apply in continuous operation from bottom to top of joint vertically and horizontally in a single direction. Apply using adequate pressure to fill and seal joint width.
  1. Tool sealants immediately with appropriately shaped tool to force sealants against joint backing and joint substrates, eliminating voids and ensuring full contact.
  2. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
  3. Tool exposed joint surface concave using tooling agents approved by sealant manufacturer for application.
  
- D. Field Quality Control
  1. Field-Adhesion Testing: Perform adhesion tests in accordance with manufacturer's instructions and with ASTM C 1193, Method A.
    - a. Perform 5 tests for the first 1000 feet (300 m) of joint length for each kind of sealant and joint substrate, and one test for each 1000 feet (300 m) of joint length thereafter or 1 test per each floor per building elevation, minimum.
    - b. For sealant applied between dissimilar materials, test both sides of joint.
  2. Water Testing:
    - a. Water test each sealant joint surface for leaks at point of substantial completion but before demobilization from the site.
    - b. Spray sealant joints continuously with sprinklers or other methods approved by the Engineer for a minimum of 4 hours ensuring full coverage of joint surface.
    - c. Notify Engineer of water testing and inspect underside of deck for leaks and repair joints as necessary. Repeat water tests and make further repairs until sealant joint is watertight.

3.2 COMMISSIONING  
A. N/A

END OF SECTION 07 92 10



SECTION 07 95 13.16

EXTERIOR EXPANSION JOINT COVER ASSEMBLIES

1.1 SCOPE

- A. Joint filler and cover for void between Parking Garage and Community Center

1.2 EXTERIOR EXPANSION JOINT COVERS

- A. Exterior metal-plate joint cover.
- B. Exterior elastomeric-seal joint cover.
- C. Exterior pre-compressed insulating foam wall expansion joint seals.

1.3 ACCESSORIES

- A. Moisture barriers.

END OF SECTION 0795 13.16



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

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SECTION 07 95 13 .19

PARKING DECK EXPANSION JOINT COVER ASSEMBLIES

1.1 SCOPE

- A. Expansion joint cover systems for Parking Garage.

1.2 PARKING DECK EXPANSION JOINT COVERS

- A. Metal-plate parking deck joint cover.
- B. T-joint parking deck joint cover.
- C. Compression-seal parking deck joint cover.
- D. Pre-compressed foam parking deck expansion joint seals.
- E. Epoxy-bonded-seal parking deck joint cover.
- F. Strip-seal parking deck joint cover.
- G. Winged-seal parking deck joint cover.
- H. Bolt-in parking deck joint cover.
- I. Split-slab membrane parking deck joint cover.

1.3 ACCESSORIES

- A. Moisture barriers.

END OF SECTION 07 95 13.19



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

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SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

- 1.1 SUSTAINABILITY REQUIREMENTS
  - A. LEED v4:
    - 1. Recycled content.
- 1.2 PERFORMANCE REQUIREMENTS
  - A. Fire-rated assemblies.
  - B. Windborne-debris-impact-resistant doors and frames.
- 1.3 INTERIOR STANDARD STEEL DOORS AND FRAMES: May Include
  - A. Standard-Duty Doors and Frames: ANSI/SDI A250.8, Level 1.
  - B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2.
  - C. Extra-Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 3.
  - D. Maximum-Duty Doors and Frames: ANSI/SDI A250.8, Level 4.
- 1.4 EXTERIOR STANDARD STEEL DOORS AND FRAMES: May Include
  - A. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2.
  - B. Extra-Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 3.
  - C. Maximum-Duty Doors and Frames: ANSI/SDI A250.8, Level 4.
- 1.5 INTERIOR CUSTOM HOLLOW-METAL DOORS AND FRAMES: May Include
  - A. Hollow-Metal Doors and Frames: NAAMM-HMMA 860.
  - B. Commercial Doors and Frames: NAAMM-HMMA 861.
  - C. Commercial Laminated Doors and Frames: NAAMM-HMMA 867.



1.6 EXTERIOR CUSTOM HOLLOW-METAL DOORS AND FRAMES: May Include

- A. Commercial Doors and Frames: NAAMM-HMMA 861.
- B. Commercial Laminated Doors and Frames: NAAMM-HMMA 867.

1.7 ACCESSORIES

- A. Louvers:
- B. Mullions and transom bars.
- C. Terminated (hospital) stops.

1.8 INSTALLATION

- A. Metal-Stud Partitions and Concrete Walls: Frames filled with insulation.
- B. Fully welded frames

END OF SECTION 08 11 13



SECTION 08 33 26

OVERHEAD COILING GRILLES

- 1.1 This section covers automatic, overhead coiling doors
  
- 1.2 PERFORMANCE REQUIREMENTS
  - A. Loading: Design components to resist anticipated wind, seismic and impact loads.
  - B. Deflection Limits: Design overhead coiling doors to withstand anticipated loading.
  
- 1.3 OPEN-CURTAIN GRILLE ASSEMBLY
  - A. Steel Door Curtain Slats: Zinc Coated (Galvanized) cold rolled structural steel sheet, complying with ASTM A 653/ A653M with G90 (Z275) zinc coating.
  - B. Operation Cycles: T.B.D.
  - C. Hood: Galvanized steel, Nominal 0.028" thick minimum steel sheet with G90 (Z275) zinc coating complying with ASTM A653/A 653 M.
  - D. Electric Grille Operator:
    - 1. Obstruction-detection device per all applicable codes.
  - E. ACCESSORIES
    - 1. Locks: Provide Locks with cylinders, Master-keyed into the facility master or Grand-Master keying system.
  
- 1.4 MAINTENANCE SERVICE
  - A. Initial Maintenance Service: Three months minimum.
  
- 1.5 DEMONSTRATION
  - A. Factory-authorized representative to train Owner's personnel.

END OF SECTION 08 33 26



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

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SECTION 08 42 13

ALUMINUM-FRAMED ENTRANCES

- 1.1 SUSTAINABILITY REQUIREMENTS
  - A. LEED v4
    - 1. Recycled content.
    - 2. Regional materials.
    - 3. Low-emitting sealant.
  
- 1.2 WARRANTY
  - A. Materials and Workmanship: TBD
  - B. Finish: TBD
  
- 1.3 PERFORMANCE REQUIREMENTS
  - A. Windborne-Debris-Impact Resistance.
  
- 1.4 SYSTEM COMPONENTS
  - A. Framing Members:
    - 1. Exterior Envelope: Thermally broken
    - 2. Other locations: Nonthermal
  - B. Entrance Doors:
    - 1. Door Construction: TBD
    - 2. Door Design: TBD.
    - 3. Glazing stops and gaskets.
  - C. Entrance Door Hardware: See Section 087100: Door Hardware.
  - D. Glazing: Section 088000 "Glazing."
  
- 1.5 ALUMINUM FINISHES
  - A. Aluminum Finishes: High-performance organic, two-coat PVDper RFP



1.6 Special Inspections

- A. Testing: Owner engaged.

1.7 MAINTENANCE SERVICE

- A. Entrance Door Hardware: Six months minimum.

END OF SECTION 08 42 13

SECTION 08 51 13

ALUMINUM WINDOWS

1.1 QUALITY ASSURANCE

- A. Mockups for each form of construction.

1.2 WARRANTY

- A. Windows: 10 years from date of Substantial Completion.
- B. Glazing Units: T.B.D.
- C. Aluminum Finish: T.B.D.

1.3 WINDOW PERFORMANCE REQUIREMENTS

- A. Product Standard: AAMA/WDMA/CSA 101/I.S.2/A440.
  - 1. Minimum Performance Class: As indicated on Drawings
  - 2. Minimum Performance Grade: As indicated on Drawings
- B. Thermal Transmittance: 0.036 maximum U factor
- C. Solar Heat-Gain Coefficient: .58 maximum.
- D. Sound Transmission Class: TBD.
- E. Windows must be designed to handle wind, seismic and impact loads.

1.4 ALUMINUM WINDOWS

- A. Frames and Sashes: Thermally improved aluminum extrusions.
- B. Glazing:
  - 1. Glass: Clear, insulating, with low-E coating
- C. Aluminum Finish: 2 coat high-performance organic coating with AAMA 2605 with minimum 70% PVDF resin by weight for both color coat and clear top coat.



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

1.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner engaged.

END OF SECTION 08 51 13





SECTION 08 71 00

DOOR HARDWARE

1.1 WARRANTY

- A. Materials and Workmanship: Two years.

1.2 MAINTENANCE SERVICE

- A. Full-Maintenance Service: 12 months.

1.3 FIELD QUALITY CONTROL

- A. Independent Architectural Hardware Consultant: Design Builder engaged.
- B. Occupancy Adjustment: After six months.

1.4 DOOR HARDWARE SCHEDULE

Set:

1.0 Stair Door (Interior)

- 3 Hinge
- 1 Passage Set
- 1 Door Closer
- 1 Wall / Floor Stop
- 3 Gasketing
- 1 Threshold



Set:

1.1 Stair Door (Exterior)

- 3 Hinge
- 1 Passage Set
- 1 Door Closer
- 1 Wall / Floor Stop
- 3 Gasketing
- 1 Threshold
- 1 Door Cap

Set:

2.0 Closet

- 3 Hinge
- 1 Storeroom Lock
- 1 Wall / Floor Stop
- 3 Silencer

Set:

3.0 Trash Room Pair Doors with Holdopens

- 6 Hinge
- 2 Surface Mounted Flush Bolt (inactive leaf)
- 1 Dust Proof Strike
- 1 Deadbolt
- 2 Adjustable Surface Overhead Stop
- 2 48" Diamond Plate

Set:

4.0 Passageway Pair Doors with Holdopens

- 6 Hinge
- 2 Flush Bolt (inactive leaf)
- 1 Dust Proof Strike
- 1 Storeroom Lock
- 2 Closer with 110 degree holdopen
- 2 48" Diamond Plate



Set:

5.0 Mechanical Room

- 3 Hinge
- 1 Storeroom Lock
- 1 Dust Proof Strike
- 1 Wall / Floor Stop
- 3 Gasketing
- 1 Threshold

Set:

5.1 Mechanical Room

- 3 Hinge
- 1 Storeroom Lock
- 1 Door Closer
- 1 Dust Proof Strike
- 1 Wall / Floor Stop
- 3 Silencer

Set:

5.2 Mechanical Room

- 3 Hinge
- 1 Storeroom Lock
- 1 Dust Proof Strike
- 1 Wall / Floor Stop
- 3 Silencer
- 1 Threshold

Set:

5.3 Mechanical Room

- 3 Hinge
- 1 Storeroom Lock
- 1 Door Closer
- 1 Wall / Floor Stop
- 3 Gasketing
- 1 Threshold



Set:

5.4 Mechanical Room

- 3 Hinge
- 1 Deadbolt
- 1 Wall / Floor Stop
- 3 Gasketing
- 1 Threshold

Set 6.0 Mechanical Pair Doors

- 6 Hinge
- 2 Flush Bolt (inactive leaf)
- 1 Dust Proof Strike
- 1 Storeroom Lock
- 4 Gasketing
- 2 Threshold
- 2 Wall / Floor Stop

Set 6.1 Mechanical Pair Doors

- 6 Hinge
- 2 Flush Bolt (inactive leaf)
- 1 Dust Proof Strike
- 1 Storeroom Lock
- 2 Silencer
- 2 Threshold
- 2 Wall / Floor Stop

Set 6.2 Mechanical Pair Doors

- 6 Hinge
- 2 Flush Bolt (inactive leaf)
- 1 Dust Proof Strike
- 1 Storeroom Lock
- 1 Closer with 110 degree holdopen
- 4 Gasketing
- 2 Threshold



Set:

7.0 Parking Lobby Entrance Pair Doors

- 6 Hinge
- 1 Passage Set  
Concealed Closer with 110 degree Overhead
- 2 Stop
- 4 Gasketing
- 2 Automatic Door Bottom

Set 7.1 Community Center Entrance Pair Doors

- 6 Hinge
- 4 Head/Foot Cylinder Deadbolt
- 1 Fail Secure Electric Lock  
Concealed Closer with 110 degree Overhead
- 2 Stop
- 4 Gasketing
- 2 ElectroLynx Harness - Door
- 2 ElectroLynx Harness - Frame
- 1 Card Reader
- 1 Power Supply
- 2 Threshold

Set:

8.0 Toilet

- 3 Hinge
- 1 Passage Set
- 1 Deadbolt with Occupied Indicator
- 1 Concealed Overhead Stop

Set:

9.0 Janitor's Closet

- 3 Hinge
- 1 Deadbolt
- 1 Wall / Floor Stop
- 3 Gasketing
- 1 Threshold



Set:  
10.0 Mechanical Room

- 3 Hinge
- 1 Deadbolt
- 1 Wall / Floor Stop
- 3 Gasketing
- 1 Threshold

Set:  
11.0 Parking Office

- 3 Hinge
- 1 Classroom Lock  
Concealed Closer with 110 degree Overhead
- 1 Stop
- 3 Gasketing
- 1 Threshold

END OF SECTION 08 71 00



SECTION 08 80 00

GLAZING

1.1 Scope:

- A. This section includes glass and glazing that has been produced, fabricated and installed to withstand thermal movement, wind loading, seismic loading and impact loading without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glass and glazing materials and other defects.
- B. This section includes
  - 1. Insulated glazing for window, storefronts (if applicable), curtainwalls (if applicable), and entrance doors
  - 2. Single pane glazing systems for wind screens

1.2 SUSTAINABILITY REQUIREMENTS

- A. LEED v4:
  - 1. Low-emitting sealants.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- B. Glass Testing Agency Qualifications: A qualifying testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- C. Sealant Testing Qualifications: A testing Agency qualified according to ASTM C 1021 to conduct the testing indicated.
- D. Source Limitations for Glass: obtain ultra clear float glass and laminated glass from a single source manufacturer for each glass type.
- E. Source Limitations for Glazing Accessories: obtain glazing accessories from a single source manufacturer for each glazing product type and installation method.
- F. Glazing Publications: Comply with Published Recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated in the Project Specifications and/or Drawings.
- G. Install glazing in mockups specified in other Division 08 Sections.



1.4 WARRANTY

- A. Coated-Glass Products: 10 years.
- B. Insulating Glass: 10 years.

END OF SECTION 08 80 00





SECTION 08 91 19

FIXED LOUVERS

1.1 SUSTAINABILITY REQUIREMENTS

A. LEED V4:

1. Recycled content.
2. Regional materials.

1.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Contractor to design louvers.

1. Wind Loads
2. Seismic Performance
3. Windborne-Debris-Impact Resistance

1.3 PRODUCTS

A. May include:

1. Fixed Extruded-Aluminum Louvers
2. Fixed Acoustical Louvers
3. Louver Screens
  - a. Bird and Insect screening
4. Blank-Off Panels

B. Finishes:

1. Aluminum: 4 coat high-performance organic coating with AAMA 2605 with minimum 70% PVDF resin by weight for both color coats and clear top coat.
2. Galvanized Steel: Baked enamel or powder coat.
3. Stainless Steel: TBD

END OF SECTION 08 91 19



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

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SECTION 09 21 16 .23

GYPSUM BOARD SHAFT WALL ASSEMBLIES

1.1 SCOPE:

- A. Fire-rated gypsum board shaft partitions for stair, elevator, and other one-sided installation in Community Center

1.2 SUSTAINABILITY REQUIREMENTS

- A. LEED v4
  - 1. Recycled content.
  - 2. Regional materials.

1.3 GYPSUM BOARD SHAFT WALL ASSEMBLIES

- A. Fire-Resistance Rating: As indicated 2 hours
- B. STC Rating: As indicated; 51, minimum
- C. Gypsum shaft liner board, moisture- and mold-resistant, Type X
- D. Non-load-bearing steel framing in manufacturer's standard profiles.
  - 1. Firestop tracks to allow movement.
- E. Sound attenuation blankets.

1.4 AUXILIARY MATERIALS

- A. Trim accessories.
- B. Steel drill screws.
- C. Track fasteners.
- D. Reinforcing.
- E. Acoustical sealant.
- F. Gypsum board cants.

END OF SECTION 09 2116.23



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

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SECTION 09 29 00

GYPSUM BOARD

1.1 SCOPE:

- A. Typical interior gypsum wall board for the Community Center

1.2 QUALITY ASSURANCE

- A. Mockups for the following:
  - 1. Levels of exposed gypsum board finish.

1.3 SUSTAINABILITY REQUIREMENTS

- A. LEED v4
  - 1. Recycled content.
  - 2. Regional materials.
  - 3. Low-emitting adhesives.

1.4 MATERIALS

- A. Interior Gypsum Board:
  - 1. Gypsum wallboard.
  - 2. Gypsum board, Type X.
  - 3. Gypsum ceiling board.
  - 4. Impact-resistant gypsum board.
  - 5. Mold-resistant gypsum board.
- B. Exterior Gypsum Board for Ceilings and Soffits:
  - 1. Exterior gypsum soffit board.
  - 2. Glass-mat gypsum sheathing board.
- C. Tile-Backing Panels:
  - 1. Glass-mat, water-resistant backing board.
  - 2. Cementitious backer units.
  - 3. Water-resistant gypsum backing board.



D. Trim Accessories:

1. Interior.
2. Exterior.
3. Aluminum: Extruded profiles.

E. Auxiliary Materials:

1. Laminating Adhesive.
2. Acoustical Sealant.

END OF SECTION 09 29 00

SECTION 09 91 13

EXTERIOR PAINTING

- 1.1 SCOPE:
  - A. Paint coatings for exterior surfaces on Community Center and Parking Garage
  
- 1.2 SUSTAINABILITY REQUIREMENTS
  - A. LEED v4:
    - 1. Low-emitting paints and coatings.
  
- 1.3 SUMMARY
  - A. Primers.
  - B. Finish coatings.
  - C. Floor sealers and paints.
  
- 1.4 QUALITY ASSURANCE
  - A. Mockups for each color and finish.
  
- 1.5 FIELD QUALITY CONTROL
  - A. Testing Agency: Owner engaged.
  
- 1.6 EXTERIOR PAINTING SCHEDULE
  - A. Concrete Substrates, Traffic Surfaces:
    - 1. Latex floor paint system.
    - 2. Latex deck coating system.
  - B. Concrete Masonry Unit Substrates:
    - 1. Latex system.
  - C. Steel and Iron Substrates:



1. Water-based, light industrial coating system.
- D. Galvanized-Metal Substrates:
1. Water-based, light industrial coating system.
- E. Aluminum Substrates:
1. Water-based, light industrial coating system.

END OF SECTION 09 91 13



SECTION 09 91 23

INTERIOR PAINTING

- 1.1 SCOPE:
  - A. Paint coatings for interior surfaces in Community Center and Parking Garage.
  
- 1.2 SUSTAINABILITY REQUIREMENTS
  - A. LEED v4
    - 1. Low-emitting paints and coatings.
  
- 1.3 SUMMARY
  - A. Primers.
  - B. Finish coatings.
  - C. Floor sealers and paints.
  - D. Dry-fall coatings.
  
- 1.4 QUALITY ASSURANCE
  - A. Mockups for each color and finish.
  
- 1.5 FIELD QUALITY CONTROL
  - A. Testing Agency: Owner engaged.
  
- 1.6 INTERIOR PAINTING SCHEDULE
  - A. Concrete Substrates, Traffic Surfaces:
    - 1. Latex floor enamel system.
  - B. CMU Substrates:
    - 1. Latex system.



- C. Steel Substrates:
  - 1. Latex system, alkyd primer.
- D. Galvanized-Metal Substrates:
  - 1. Latex system.
- E. Aluminum (Not Anodized or Otherwise Coated) Substrates:
  - 1. Latex system.
- F. Gypsum Board Substrates:
  - 1. Latex over latex sealer system.

END OF SECTION 09 91 23



SECTION 10 14 00

SIGNAGE

PART 1 GENERAL

1.1 SUMMARY

1. Work included: the work of this section consists of illuminated and non illuminated signage work, and includes but is not limited to the following:
  1. Wall mounted signs
  2. Pylon signs (free standing signs)
  3. Post and Panel signs and frames, including code mandated signs and room identification signs.
  4. Ceiling mounted single face and double face signs.
  5. Provide a facility wayfinding system, consisting of illuminated, variable message signs throughout the facility.
  6. Exterior illuminated dimensional characters and numbers.
2. Related documents and sections: examine contract documents for requirements that directly affect or are affected by work of this section. A list of those documents and sections include, but is not limited to the following:
3. Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 01 General Requirements Specification Sections, apply to this Section.

1.2 QUALITY ASSURANCE

1. Installer qualifications: Fabricator of products.
2. Fabricator qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this project and whose products have a record of successful in-service performance.
3. Source limitations for signs: Obtain each sign type indicated from one source from a single manufacturer.
4. Regulatory requirements: Comply with applicable provisions for accessibility guidelines.
  1. Comply with the State of New York and Americans with Disabilities Act (ADA) 2010 requirements and other authorities having jurisdiction for proper fabrication and installation procedures.



### 1.3 SUSTAINABILITY REQUIREMENTS

#### A. BUILDING RATING:

USGBC LEED Rating: Comply with project requirements intended to achieve the following Rating, as measured and documented according to the USGBC LEED Green Building Rating System, Version indicated:

1. Rating: Gold.
2. Version: LEED v4 for BD+C

#### B. DIVISION 01 REQUIREMENTS:

1. Section 015100 – CONSTRUCTION INDOOR AIR QUALITY
2. Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
3. Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS..

#### C. LEED PERFORMANCE REQUIREMENTS:

Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for requirements including, but not limited to:

1. Minimum recycled content.
2. Minimum regional content.
3. VOC content limitations.

#### D. MATERIAL PRODUCT DECLARATIONS:

In addition to the requirements for manufacturers' transparency required by leed v4, the owner has established a goal of supporting and encouraging transparency and openness in the product supply chain by giving preference to manufacturers that supply one or all of the following for their products:

1. Health Product Declaration (HPD).
2. Life Cycle Assessment (LCA).
3. Environmental Product Declaration (EPD).

#### E. LEED SUBMITTALS:

Refer to section 018113 - sustainable design requirements for submittal requirements. Particular attention should be paid to the following:

1. For all materials in this section, provide documentation from manufacturer indicating percentages of post-consumer and pre-consumer recycled content. Submit with Sustainable Materials Reporting Form (SMRF), included in Section 018113, indicating the costs for material, delivery, and tax, excluding labor.



2. For all materials in this section, provide documentation from manufacturer indicating the location of manufacture, extraction and harvest of all materials provided under this section. Submit with Sustainable Materials Reporting Form (SMRF), included in Section 018113, indicating the costs for material, delivery, and tax, excluding labor.
3. Provide Material Safety Data Sheet (MSDS) or letter from manufacturer certifying the VOC content for each adhesive, sealant, paint and coating, flooring, and composite wood product does not exceed the maximum VOC threshold based on application.
4. Where new wood products are used and will be permanently installed inside the building, provide vendor invoices for each new wood product that has been harvested in accordance with the FSC standards. Invoices shall include chain-of-custody, certificate numbers, and itemized costs for all certified products.

#### 1.4 DEFINITIONS

- A. ADA-ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans With Disabilities Act (Ada) Accessibility Guidelines For Buildings And Facilities; Architectural Barriers Act (Aba) Accessibility Guidelines."

#### 1.5 SUBMITTALS

- A. Sustainable Design Submittals: Refer to the general requirements for sustainable design submittal requirements
- B. Product Data: For each type of product indicated.
- C. Shop Drawings: Provide shop drawings for fabrication and erection of signs. Include plans, elevations, and large-scale sections of typical members and other components. Show anchors, grounds, reinforcement, accessories, layout, and installation details.
  1. Provide message list for each sign required, including full-size details of wording and layout of lettering.
  2. For signs supported by or anchored to permanent construction, provide setting drawings, templates, and directions for installation of anchor bolts and other anchors to be installed as a unit of Work in other Sections.
  3. Furnish full-size spacing templates for individually mounted dimensional numbers.
- D. Samples: Submit samples of each sign component for initial selection of color, pattern and surface texture as required and for verification of compliance with requirements indicated.
- E. Qualification Data: For fabricator.
- F. Maintenance Data: For signs to include in maintenance manuals.
- G. Warranty: Special warranty specified in this section.

#### 1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify recess openings by field measurements before fabrication and indicate measurements on shop drawings.



PIN: 8502020CR0040P-42P  
Outline Specification

PART 2 - PRODUCTS: For further development after Award of Project

PART 3 - EXECUTION: For further development after Award of Project

END OF SECTION 10 14 00



SECTION 10 28 00  
TOILET ACCESSORIES

- 1.1 This Section covers Toilet Accessories for:
- A. Initial core and shell toilet room build-outs at the community center tenant spaces
  - B. Parking office toilets
- 1.2 WARRANTIES
- A. Warranties for fixtures at Core and Shell toilets for Community Center tenant spaces:
    - 1. Silver Spoilage for Mirrors: none.
    - 2. Toilet-Compartment Occupancy-Indicator System: Two years.
    - 3. Hand Dryers: 2 years
  - B. Warranties for Parking office toilets
    - 1. Silver Spoilage for Mirrors: 10 years.
    - 2. Toilet-Compartment Occupancy-Indicator System: Five years.
    - 3. Hand Dryers: 5 years
- 1.3 PRODUCTS
- A. Public-Use Washroom Accessories:
    - 1. Toilet tissue (roll) dispenser.
    - 2. Combination toilet tissue dispenser.
    - 3. Toilet tissue (jumbo-roll) dispenser.
    - 4. Paper towel (folded) dispenser.
    - 5. Paper towel (roll) dispenser.
    - 6. Automatic paper towel (roll) dispenser.
    - 7. Waste receptacle.
    - 8. Combination towel (folded) dispenser/waste receptacle.
    - 9. Combination towel (roll) dispenser/waste receptacle.
    - 10. Multipurpose soap/towel dispenser unit.
    - 11. Soap dispenser.
    - 12. Automatic soap dispenser.
    - 13. Grab bar.
    - 14. Sanitary-napkin and tampon vendor.
    - 15. Sanitary-napkin disposal unit.
    - 16. Seat-cover dispenser.
    - 17. Purse shelf.
    - 18. Mirror unit.
    - 19. Hook.
    - 20. Fixed height adult changing station.
    - 21. Adjustable height adult changing station.



- B. Toilet-compartment occupancy-indicator system.
- C. Hand Dryers:
  - 1. Warm-air dryer.
  - 2. High-speed air dryer.
  - 3. Multiple airflow hand dryer.
- D. Underlavatory guards.
- E. Custodial Accessories:
  - 1. Utility shelf.
  - 2. Mop and broom holder.
  - 3. Paper towel (folded) dispenser.
  - 4. Paper towel (roll) dispenser.
  - 5. Liquid-soap dispenser.

END OF SECTION 10 28 00





SECTION 10 44 16

FIRE EXTINGUISHERS

1.1 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

1.2 WARRANTY

- A. Materials and Workmanship: Six years.

1.3 PERFORMANCE REQUIREMENTS

- A. Fire Extinguishers: Complying with NFPA 10

1.4 PRODUCTS

- A. Portable Hand-Carried Fire Extinguishers may include any of the following, as appropriate for the project, to be determined after further design post Award:

1. Stored-pressure water type.
2. Stored-pressure antifreeze water type.
3. Stored-pressure water-mist type.
4. Pressurized, AFFF-foam type.
5. Pressurized, FFFP-foam type.
6. Wet-chemical type.
7. Regular dry-chemical type.
8. Multipurpose dry-chemical type.
9. Purple-K dry-chemical type.
10. Carbon dioxide type.
11. Dry-powder type.

- B. Mounting brackets.

END OF SECTION 10 44 16



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

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SECTION 11 12 00

PARKING CONTROL EQUIPMENT

PART 1 - GENERAL

1.1 Summary

- A. Parking Control System and Parking Guidance System for transient flat rate or hourly parking.
- B. Fully integrated subsystem of Division 28 Security Electronics system.

1.2 Quality Assurance

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this project.
- B. Source Limitations: Obtain parking control equipment from single source from single manufacturer.
- C. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70 by a qualified testing agency, and marked for intended location and application.

1.3 Sustainability Requirements

- A. Reference specification section 01 81 13.

PART 2 - PRODUCTS

2.1 Products

- A. Automatic Barrier Gates
  - 1. Controller: Communicating
  - 2. Cabinet: Stainless Steel
  - 3. Gate Arm: Folding
  - 4. Operator: ½ hp
- B. Vehicle Detectors: Vehicle loop detector system embedded in concrete slabs on grade. As required for lane configurations on drawings.
- C. Entry Terminals: Activated by button when vehicle detected.
  - 1. Cabinet: Stainless Steel
  - 2. Tickets: Standard paper, Magnetic-stripe or Barcode type. To be coordinated with DDC.
  - 3. Operation: Online communication to remote computer.
- D. Exit Terminals: Activated by ticket insertion. Provide credit card payment system if ticket has not be previously validated.
  - 1. Cabinet: Stainless Steel
  - 2. Operation: Online communication to remote computer
- E. Controller: Shall contain logic for one-way lanes, two-way lanes, operations with automatic and push button entrance terminals, detector loops and must be easily field programmable.
- F. Pay Stations:
  - 1. Operation: Pay-on-foot located at each elevator lobby, with online communication to remote computer.
  - 2. Payment: Parkers can pay via credit card or cash with optional receipt. Validated ticket will be returned for exiting.
  - 3. ADA compliant.
- G. Monitoring: All exit and entrance lane equipment will be monitored via remote workstation located in the parking office. System will monitor status of the equipment including gates, entry terminals, exit terminals and pay-on-foot stations and communicate that status via computer monitor, full duplex gooseneck microphone, and speakers, as well as Division 28 16-up monitor(s) by others.



- H. Parking Facility Management Software: Capable of collecting data for revenue and activity reporting and for access and space control, tracking tickets, and programming parking control equipment.
- I. Manufacturer shall be able to demonstrate successful performance of proposed system and equipment. Manufacturer shall ensure the following for all primary components:
  - 1. Shall have been in continuous operation as a business for the past 5 years.
  - 2. Shall have the current version of equipment successfully operating in three or more comparable parking garages.
  - 3. Approved by the NYC DOT.
- J. Provide full duplex intercom between all parking control equipment and the parking office workstation.
- K. Parking Guidance System:
  - 1. Provide ultrasonic sensors at all exit and entrance lanes including reconfigurable center lanes.
  - 2. Provide two outdoor displays, one at each vehicular entrance, indicating ***the number of vacant spaces in the entire parking garage*** at any given time.
  - 3. Provide custom control units as required for a complete, functioning system.
  - 4. Provide a server and custom software for a self contained, complete, functioning system.

### PART 3 - EXECUTION

#### 3.1 General Execution Requirements

- A. Entire system must be from one manufacturer or have proven compatibility.
- B. Install systems, materials, wiring and equipment to conform with manufacturer's instructions and approved submittals, including coordinating drawings. Conform to arrangements indicated on the contract drawings and approved shop drawings.
- C. Testing shall be provided by the Manufacturer's service representative.
  - 1. Equipment to be tested for compliance to these specifications and the manufacturer's performance standards.
- D. Training shall be provided by the Manufacturer's service representative.
- E. Full maintenance: Provided for 12 months.

#### 3.2 Commissioning

- A. As directed by Division 28 Security Electronic specification sections.

END OF SECTION 11 12 00



SECTION 12 93 10

BICYCLE RACKS

1.1 SUMMARY

- A. Section includes bicycle parking racks

1.2 WARRANTY

- A. A one year manufacturer's limited warranty against defects in materials and workmanship.

1.3 PERFORMANCE REQUIREMENTS

- A. Installer Qualifications: An experienced installer who has completed installation of similar bicycle parking racks.
- B. Source Limitations: For consistent quality in appearance and physical properties obtain each bicycle rack product from a single manufacturer

1.4 SUBMITTALS

- A. Product Data: Include physical characteristics such as materials, specifications and finish.
- B. Drawings: Show details including dimensions, materials, and options for each product.
- C. Maintenance Data: For each product include the recommended methods for repairing damage to the materials finish will be provided.

1.5 MATERIALS

- A. Galvanized Steel
  1. Galvanizing: Standard specification for zinc (hot-dip galvanized) coatings on iron and steel products
  2. Surface quality shall meet the American Galvanizing Association standards.

1.6 EXECUTION

- A. Installer Qualifications: An experienced installer who has completed installation of similar bicycle parking racks.

END OF SECTION 12 93 10



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

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SECTION 14 21 00  
GEARLESS TRACTION ELEVATORS

PART 1- SUMMARY

1.1 SCOPE

- A. Gearless overhead traction elevators serving the parking garage
- B. This section may also cover the elevator in the Community Center should the Design Builder select an overhead gearless traction elevator in the Community Center.

1.2 WARRANTY AND MAINTENANCE SERVICE

- A. Elevator Work Warranty: 2 Years
- B. Full Maintenance Service Warranty Service: 2 Years

1.3 ELEVATORS

- A. Elevator Number(s): 1 and 2
- B. May Apply to Elevator 3 as well
- C. Machine Location: Cellar level Machine Room and Machines in hoistway over-run.
- D. Machine Type: Overhead Gearless traction.
- E. Rated Load:
  - 1. Minimum 3500 lb (1589 kg) for a hospital Configuration per RFP.
  - 2. Minimum 4,000 lb for a standard configuration per RFP
  - 3. Design Builder shall provide traffic flow analysis of the Parking Garage to determine required elevator capacity. Provide additional load capacity based on required elevator capacity as determined above.
- F. Rated Speed:
  - 1. Minimum 350 fpm per RFP.
  - 2. Design Builder shall provide traffic flow analysis of the Parking Garage to determine required elevator capacity. Provide additional elevator speed based on required elevator capacity as determined above.
- G. Operation System:
  - 1. Group automatic operation for the Parking Garage



2. If Design Builder selects a gearless traction elevator for the Community center, it shall be operated as a single elevator independent of the Parking Garage.
- H. Auxiliary Operations:
1. Battery-powered automatic evacuation.
  2. Earthquake Emergency Operation: ASME A17.1/CSA B44.
  3. Automatic dispatching of loaded car.
  4. Nuisance-call cancel.
  5. Distributed parking.
  6. Automatic operation of lights and ventilation fans.
  7. Independent service.
  8. Inspection Service
- I. Security Features: Key-switch floor lock-out.
- J. Dual car-control stations for center opening door configurations.
- K. Car Enclosures: Steel framed with nonremovable wall panels and tamper proof equipment.
1. Inside Width and Depth
    - a. Shall be a function of required elevator capacity based on traffic flow and peak demand analysis of the Parking Garage provided by the Design Builder.
    - b. Provide adequate room for a stretch in at least of the elevator cars serving the Parking Garage.
  2. Inside Height: 93 inches minimum clear
  3. Interior Walls:
    - a. Parking Garage: Stainless steel with a number 4 finish
    - b. Community Center: Stainless Steel with number 4 finish at front wall. Bronze panels with stainless steel framing at side and rear wall
  4. Doors: Stainless steel.
  5. Door Sills: Nickel silver.
  6. Ceiling: Stainless steel with LED lighting].
  7. Handrails: Stainless steel.
  8. Floor- non-slip epoxy.
- L. Hoistway Entrances:
1. Width: 48 inches (1219 mm).
  2. Height: 84 inches (2134 mm).
  3. Type: Single-speed center opening is preferred per the RFP.
  4. Frames Stainless steel.
  5. Doors and transoms: Stainless steel.
  6. Sills: Nickel silver.
- M. Hall Fixtures: Tamper proof and weather-proof stainless steel fixtures.





1.4 TRACTION SYSTEMS

- A. Passenger Elevator Machines: Variable-voltage, variable-frequency ac type; with solid-state power converters.
- B. Emergency braking in compliance with ASME A17.1 section 2.19
- C. Regenerative drive system.
- D. Standard T-section Guide rails.
- E. Steel Hoist and governor ropes.

1.5 SIGNAL EQUIPMENT

- A. Car Control Stations: Swing open panels
- B. Firefighters' two-way telephone communication service.
- C. Fire-command-center annunciator panel.
- D. Hall Lanterns: Provide at all landings, including integral position indicator.

PART 2- PRODUCTS: For further development after Award of project.

PART 3- EXECUTION: For further development after Award of project.

END OF SECTION 14 21 00



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

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SECTION 14 24 00  
HYDRAULIC ELEVATORS

1.1 SCOPE

- A. Passenger elevator at Community Center only
- B. Design Builder by choose to select a gearless traction Elevator at the Community Center as an enhancement beyond the minimum requirements of the RFP.
- C. This section does not apply to the elevators at the Parking Garage. Elevators at the parking Garage must be Gearless Traction Elevator as specified under Section 14 21 00.
- D. This section only applies as an option for elevators with a vertical run less than 30'-0"

1.2 WARRANTY AND MAINTENANCE SERVICE

- A. Elevator Work Warranty: 2 years
- B. Full Maintenance Service: 2 years

1.3 ELEVATORS

- A. Elevator Number: 3 (Community Center location)
  - 1. As noted in paragraph 1.1B of this section, the Design Builder reserves the option to install a Gearless Traction Elevator instead of a Hydraulic Elevator at Elevator #3.
- B. Cylinder Type: Holeless, beside the car.
- C. Rated Load: IBC Stretcher Capacity
  - 1. 3500 lb. (1589 kg) minimum for hospital configuration
  - 2. 4000 lb (1816 kg) minmum for standard configuration.
- D. Rated Speed: Minimum 150 fpm (0.76 m/s)
- E. Operation System: Single automatic.
- F. Auxiliary Operations:
  - 1. Power loss rescue feature. Emergency generator power operations
  - 2. Earthquake emergency operation
  - 3. Automatic dispatching of loaded car.
  - 4. Off-peak operation.



5. Automatic operation of lights and ventilation fans.
6. Priority service.
7. Independent service
8. Inspection service
9. Firefighters' Emergency operation, Phase I and Phase II

G. Security Features: Floor lock-offs

H. Car Enclosures: Steel framed with nonremovable wall panels.

I.

1. Inside Height: 93 inches (2362 mm) clear.
2. Front Walls (Return Panels): Stainless steel with #4 finish.
3. Side and Rear Wall Panels: Bronze panels with stainless steel framing
4. Doors: Stainless steel.
5. Ceiling: Stainless steel with LED lighting and boundary lighting.
6. Handrails: Stainless steel.
7. Floor: Non-slip epoxy

J. Hoistway Entrances:

1. Width: 48 inches (1219 mm) minimum.
2. Height: 84 inches.
3. Frames: Stainless steel
4. Doors: Stainless steel.
5. Sills: Nickel silver.

K. Hall Fixtures at all floors: tamper proof and weather-proof Stainless steel.

#### 1.4 SYSTEMS AND COMPONENTS

A. Pump Units: Mounted on oil tank in steel enclosure preferred.

1. Motor: Variable-voltage variable-frequency control.

B. Hydraulic Fluid: Manufacturer's standard

#### 1.5 SIGNAL EQUIPMENT

A. Car-Control Stations: Swing-return type.

B. Firefighters' two-way telephone communication service.

END OF SECTION 14 24 00



SECTION 21 05 17

SLEEVES AND SLEEVE SEALS FOR FIRE-SUPPRESSION PIPING

**PART 1 - GENERAL**

1.1 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 Summary

- A. Section Includes:
  - 1. Sleeves.
  - 2. Stack-sleeve fittings.
  - 3. Sleeve-seal systems.
  - 4. Sleeve-seal fittings.
  - 5. Grout.

1.3 Action Submittals

- A. Product Data: For each type of product indicated.

**PART 2 - PRODUCTS**

- 2.1 Sleeves
- 2.2 Stack-Sleeve Fittings
- 2.3 Sleeve-Seal Systems
- 2.4 Sleeve-Seal Fittings
- 2.5 Grout

**PART 3 - EXECUTION**

- 3.1 SLEEVE INSTALLATION
- 3.2 Stack-Sleeve-Fitting Installation
- 3.3 Sleeve-Seal-System Installation
- 3.4 Sleeve-Seal-Fitting Installation
- 3.5 Sleeve And Sleeve-Seal Schedule

END OF SECTION 21 05 17



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

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SECTION 21 05 18

ESCUTCHEONS FOR FIRE-SUPPRESSION PIPING

PART 1 - GENERAL

1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 Summary

- A. Section Includes:
  - 1. Escutcheons
  - 2. Floor Plates

1.03 Action Submittals

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 Escutcheons

2.2 Floor Plates

PART 3 - EXECUTION

3.1 Installation

3.2 Field Quality Control

END OF SECTION 21 05 18



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SECTION 21 05 53

IDENTIFICATION FOR FIRE-SUPPRESSION PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 Summary

A. Section Includes:

1. Equipment labels.
2. Warning signs and labels.
3. Pipe labels.
4. Stencils.
5. Valve tags.
6. Warning tags.

1.3 Action Submittals

- A. Product Data: For each type of product.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment-Label Schedule: Include a listing of all equipment to be labeled and the proposed content for each label.
- D. Valve Schedules: Valve numbering scheme.

1.4 Closeout Submittals

- A. Maintenance Data: For each piping system to include in maintenance manuals.



**PART 2 - PRODUCTS**

- 2.1 Equipment Labels
- 2.2 Warning Signs and Labels
- 2.3 Pipe Labels
- 2.4 Valve Tags

**PART 3 - EXECUTION**

- 3.1 Preparation
- 3.2 Label Installation
- 3.3 Valve-Tag Installation

**END OF SECTION 21 05 53**



SECTION 21 12 00  
FIRE-SUPPRESSION STANDPIPES

PART 1 - GENERAL

1.1 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 Summary

A. Section Includes:

- 1. Pipes, fittings, and specialties.
- 2. Fire-protection valves.
- 3. Hose connections.
- 4. Hose stations.
- 5. Monitors.
- 6. Alarm devices.
- 7. Pressure gages.

B. Related Sections:

- 1. Section 211313 "Wet-Pipe Sprinkler Systems" for wet-pipe sprinkler piping.

1.3 Definitions

- A. Standard-Pressure Standpipe Piping: Fire-suppression standpipe piping designed to operate at working pressure 175 psig maximum.

1.4 System Descriptions

- A. Automatic Wet-Type, Class II Standpipe System: Includes NPS 1-1/2 hose stations. Has open water-supply valve with pressure maintained and is capable of supplying water demand.

1.5 Performance Requirements

- A. Standard-Pressure, Fire-Suppression Standpipe System Component: Listed for 175- psig minimum working pressure.



- B. Fire-suppression standpipe design shall be approved by authorities having jurisdiction.
  - 1. Minimum residual pressure at each hose-connection outlet is as follows:
    - a. Roof Manifold, NPS 1-1/2 Hose Connections: 65 psig .

#### 1.6 Action Submittals

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For fire-suppression standpipes. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Wiring Diagrams: For power, signal, and control wiring.
- C. Delegated-Design Submittal: For standpipe systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.7 Informational Submittals

- A. Coordination Drawings: Fire-suppression standpipes, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  - 1. Plumbing piping.
  - 2. HVAC hydronic piping.
  - 3. Electrical
- B. Qualification Data: For qualified Installer.
- C. Approved Standpipe Drawings: Working plans, prepared according to NFPA 14, that have been approved by authorities having jurisdiction, including hydraulic calculations if applicable.
- D. Welding certificates.
- E. Fire-hydrant flow test report.
- F. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 14. Include "Contractor's Material and Test Certificate for Aboveground Piping" and "Contractor's Material and Test Certificate for Underground Piping."
- G. Field quality-control reports.



1.8 Closeout Submittals

- A. Operation and Maintenance Data: For fire-suppression standpipes specialties to include in emergency, operation, and maintenance manuals.

1.9 Quality Assurance

A. Installer Qualifications:

- 1. Installer's responsibilities include designing, fabricating, and installing fire-suppression standpipes and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.

- a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified professional engineer.

- B. Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

- D. NFPA Standards: Fire-suppression standpipe equipment, specialties, accessories, installation, and testing shall comply with NFPA 14, "Installation of Standpipe and Hose Systems."

**PART 2 - PRODUCTS**

2.1 Piping Joining Materials

2.2 Steel Pipe And Fittings

2.3 Piping Joining Materials

2.4 Listed Fire-Protection Valves

2.5 Hose Connections

2.6 NPS 1-1/2 By NPS 2-1/2 Rack-Type Hose Stations

2.7 Alarm Devices

2.8 Pressure Gages



PART 3 – EXECUTION

- 3.1 Preparation
- 3.2 Examination
- 3.3 Service Entrance Piping
- 3.4 Piping Installation
- 3.5 Joint Construction
- 3.6 Valve And Specialties Installation
- 3.7 Hose-Connection Installation
- 3.8 Hose-Station Installation
- 3.9 Monitor Installation
- 3.10 Identification
- 3.11 Field Quality Control
- 3.12 Demonstration
- 3.13 Piping Schedule

END OF SECTION 21 12 00



SECTION 21 13 13  
WET-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 Summary

A. Section Includes:

1. Pipes, fittings, and specialties.
2. Fire-protection valves.
3. Sprinklers.
4. Alarm devices.
5. Pressure gages.

B. Related Sections:

1. Section 211200 "Fire-Suppression Standpipes" for standpipe piping.

1.3 Definitions

- A. Standard-Pressure Sprinkler Piping: Wet-pipe sprinkler system piping designed to operate at working pressure of 175 psig maximum.

1.4 System Descriptions

- A. Wet-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing water and that is connected to water supply through alarm valve. Water discharges immediately from sprinklers when they are opened. Sprinklers open when heat melts fusible link or destroys frangible device. Hose connections are included if indicated.

1.5 Performance Requirements

- A. Standard-Pressure Piping System Component: Listed for 175-psig minimum working pressure.
- B. Sprinkler system design shall be approved by authorities having jurisdiction.
  1. Margin of Safety for Available Water Flow and Pressure: 10 percent, including losses through water-service piping, valves, and backflow preventers.



2. Sprinkler Occupancy Hazard Classifications:
    - a. Building Service Areas: Ordinary Hazard, Group 1.
    - b. Electrical Equipment Rooms: Ordinary Hazard, Group 1.
    - c. General Storage Areas: Ordinary Hazard, Group 1
    - d. Mechanical Equipment Rooms: Ordinary Hazard, Group 1.
    - e. Office and Public Areas: Light Hazard.
  3. Minimum Density for Automatic-Sprinkler Piping Design:
    - a. Light-Hazard Occupancy: 0.10 gpm over 1500-sq. ft. area.
    - b. Ordinary-Hazard, Group 1 Occupancy: 0.15 gpm over 1500-sq. ft. area.
    - c. Ordinary-Hazard, Group 2 Occupancy: 0.20 gpm over 1500-sq. ft. area.
  4. Maximum Protection Area per Sprinkler:
    - a. Office Spaces: 225 sq. ft.
    - b. Storage Areas: 130 sq. ft.
    - c. Mechanical Equipment Rooms: 130 sq. ft.
    - d. Electrical Equipment Rooms: 130 sq. ft.
    - e. Other Areas: According to NFPA 13 recommendations unless otherwise indicated.
- C. Seismic Performance: Sprinkler piping shall withstand the effects of earthquake motions determined according to NFPA 13.

#### 1.6 Submittals

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For wet-pipe sprinkler systems. Include plans, elevations, sections, details, and attachments to other work.
  1. Wiring Diagrams: For power, signal, and control wiring.
- C. Delegated-Design Submittal: For sprinkler systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- D. Coordination Drawings: Sprinkler systems, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  1. Domestic water piping.
- E. Qualification Data: For qualified Installer.
- F. Welding certificates.
- G. Fire-hydrant flow test report.





- H. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping."
- I. Field quality-control reports.
- J. Operation and Maintenance Data: For sprinkler specialties to include in emergency, operation, and maintenance manuals.

#### 1.7 Quality Assurance

- A. Installer Qualifications:
  - 1. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.
    - a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified professional engineer.
- B. Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. NFPA Standards: Sprinkler system equipment, specialties, accessories, installation, and testing shall comply with the following:
  - 1. NFPA 13, "Installation of Sprinkler Systems."

#### 1.8 Coordination

- A. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.

#### 1.9 Extra Materials

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Sprinkler Cabinets: Finished, wall-mounted, steel cabinet with hinged cover, and with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler used on Project.



**PART 2 – PRODUCTS**

- 2.1 Piping Materials
- 2.2 Steel Pipe And Fittings
- 2.3 Piping Joining Materials
- 2.4 Listed Fire-Protection Valves
- 2.5 Trim And Drain Valves
- 2.6 Sprinkler Specialty Pipe Fittings
- 2.7 Sprinklers – See Schedule on Drawing
- 2.8 Alarm Devices
- 2.9 Pressure Gages

**PART 3 - EXECUTION**

- 3.1 Piping Installation
- 3.2 Joint Construction
- 3.3 Installation Of Cover System For Sprinkler Piping
- 3.4 Valve And Specialties Installation
- 3.5 Sprinkler Installation
- 3.6 Identification
- 3.7 Field Quality Control
- 3.8 Cleaning
- 3.9 Demonstration
- 3.10 Piping Schedule
- 3.11 Sprinkler Schedule

END OF SECTION 21 13 13



SECTION 21 13 39

DRY-PIPE SPRINKLER SYSTEMS

PART 1 – GENERAL

1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 Summary

A. Section Includes:

1. Pipes, fittings, and specialties.
2. Fire-protection valves.
3. Fire-department connections.
4. Sprinkler specialty pipe fittings.
5. Sprinklers.
6. Alarm devices.
7. Manual control stations.
8. Control panels.
9. Pressure gages.

B. Related Sections:

1. Section 211200 "Fire-Suppression Standpipes" for standpipe piping.
2. Section 211313 "Wet-Pipe Sprinkler Systems" for wet-pipe sprinkler piping.
3. Section 213113 "Electric-Drive, Centrifugal Fire Pumps" for fire pumps, pressure-4. maintenance pumps, and fire-pump controllers.
4. Section 283111 "Digital, Addressable Fire-Alarm System" for alarm devices not specified in this Section.

1.03 Definitions

1.04 System Descriptions

- A. **Dry-Pipe Sprinkler System:** Automatic sprinklers are attached to piping containing compressed air. Fire-detection system in same area as sprinklers actuates tripping devices that open dry-pipe valve without loss of air pressure and actuates fire alarm. Water discharges from sprinklers that have opened.
- B. **Double-Interlock Dry Pipe Sprinkler System:** Automatic sprinklers are attached to piping containing low-pressure air. Actuation of a fire-detection system in the same area as sprinklers opens the deluge valve permitting water to flow into the sprinkler piping; a closed solenoid valve in the sprinkler piping is opened by another fire-detection device; then water will discharge from sprinklers that have opened.



## 1.05 PERFORMANCE REQUIREMENTS

- A. Standard-Pressure Piping System Component: Listed for 175-psig minimum working pressure.
- B. Delegated Design: Design sprinkler system(s), including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
  - 1. Available fire-hydrant flow test records indicate the following conditions:
    - 1) Date:
    - 2) Time:
    - 3) Performed by:
    - 4) Location of Residual Fire Hydrant R:
    - 5) Location of Flow Fire Hydrant F:
    - 6) Static Pressure at Residual Fire Hydrant R:
    - 7) Measured Flow at Flow Fire Hydrant F:
    - 8) Residual Pressure at Residual Fire Hydrant R:
- C. Sprinkler system design shall be approved by authorities having jurisdiction.
  - 1. Margin of Safety for Available Water Flow and Pressure: 10 percent, including losses through water-service piping, valves, and backflow preventers.
  - 2. Sprinkler Occupancy Hazard Classifications:
    - 1) Commercial Automobile Parking Areas: Ordinary Hazard, Group 1
    - 2) Building Service Areas: Ordinary Hazard, Group 1
    - 3) Electrical Equipment Rooms: Ordinary Hazard, Group 1
    - 4) General Storage Areas: Ordinary Hazard, Group 1
    - 5) Mechanical Equipment Rooms: Ordinary Hazard, Group 1
    - 6) Office and Public Areas: Light Hazard
  - 3. Minimum Density for Automatic-Sprinkler Piping Design:
    - 1) Light-Hazard Occupancy: 0.10 gpm over 1500-sq. ft. area.
    - 2) Ordinary-Hazard, Group 1 Occupancy: 0.15 gpm over 1500-sq. ft. area.
  - 4. Maximum Protection Area per Sprinkler: Per UL listing.
  - 5. Maximum Protection Area per Sprinkler:
    - 1) Office Spaces: 120 sq. ft. 225 sq. ft.
    - 2) Storage Areas: 130 sq. ft.
    - 3) Mechanical Equipment Rooms: 130 sq. ft..
    - 4) Electrical Equipment Rooms: 130 sq. ft.
    - 5) Other Areas: According to NFPA 13 recommendations unless otherwise indicated.



6. Total Combined Hose-Stream Demand Requirement: According to NFPA 13 unless otherwise indicated:
  - 1) Light-Hazard Occupancies: 100 gpm
  - 2) Ordinary-Hazard Occupancies: 250 gpm
- D. Seismic Performance: Sprinkler piping shall withstand the effects of earthquake motions determined according to NFPA 13.

#### 1.06 Action Submittals

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: For dry-pipe sprinkler systems. Include plans, elevations, sections, details, and attachments to other work.
  1. Wiring Diagrams: For power, signal, and control wiring
- C. Delegated-Design Submittal: For sprinkler systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.07 Informational Submittals

- A. Coordination Drawings: Sprinkler systems, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  1. Domestic water piping.
  2. Compressed air piping.
  3. Items penetrating finished ceiling including the following:
    - 1) Lighting fixtures.
    - 2) Air outlets and inlets.
- B. Qualification Data: For qualified Installer and professional engineer.
- C. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations if applicable.
- D. Fire-hydrant flow test report.
- E. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping."
- F. Field quality-control reports.



1.08 Closeout Submittals

- A. Operation and Maintenance Data: For sprinkler specialties to include in emergency, operation, and maintenance manuals.

1.09 Maintenance Material Submittals

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Sprinkler Cabinets: Finished, wall-mounted, steel cabinet with hinged cover, and with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler used on Project.

1.10 Quality Assurance

- A. Installer Qualifications:
  - 1. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.
    - a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified professional engineer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. NFPA Standards: Sprinkler system equipment, specialties, accessories, installation, and testing shall comply with the following:
  - 1. NFPA 13, "Installation of Sprinkler Systems."

1.11 Coordination

- A. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.

PART 2 PRODUCTS: For Further Development After Award Of Project

PART 3 EXECUTION: For Further Development After Award Of Project

END OF SECTION 21 13 39



SECTION 21 31 13

ELECTRIC-DRIVE, CENTRIFUGAL FIRE PUMPS

PART 1 - GENERAL

1.01 Related documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 Summary

- A. This Section includes electric-drive, New York City Approved Automatic Fire Pump with controllers, automatic transfer switches and accessories.

1.03 Performance requirements

- A. Pump, Equipment, Accessory, Specialty, and Piping Pressure Rating: Refer to Schedule.

1.04 Submittals

- A. Product Data: For each type of product indicated. Include rated capacities, certified pump performance curves with each selection point indicated, operating characteristics, and furnished accessories and specialties for each fire pump and pressure-maintenance pump.
- B. Shop Drawings: For fire pumps and drivers, fire-pump controllers, fire-pump accessories and specialties, pressure-maintenance pumps, pressure-maintenance-pump controllers, and pressure- maintenance-pump accessories and specialties. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Wiring Diagrams: Power, signal, and control wiring.
- C. Product Certificates - after shipment: Factory certified performance test curves for each fire pump.
- D. Field test reports.
- E. Operation and Maintenance Data: For fire pumps and drivers, pressure-maintenance pumps, controllers, accessories and specialties, alarm panels, and flowmeter systems to include in emergency, operation, and maintenance manuals.

1.05 Quality assurance

- A. Source Limitations: Obtain fire pumps, pressure-maintenance pumps, and controllers through one source from a single manufacturer for each type of equipment.
- B. Product Options: Drawings indicate size, profiles, and dimensional requirements of fire pumps, pressure-maintenance pumps, and controllers and are based on specific systems indicated.



- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Comply with standards of authorities having jurisdiction pertaining to materials, hose threads, and installation.
- E. Comply with NFPA 20, "Stationary Pumps for Fire Protection," for fire pumps, drivers, controllers, accessories, and their installation.

1.06 Coordination

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

PART 2 - PRODUCTS: For further development after Award of Project

PART 3 - EXECUTION: For further development after Award of Project

END OF SECTION 21 31 13





SECTION 21 34 00  
PRESSURE-MAINTENANCE PUMPS

PART 1 - GENERAL

1.01 Related documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 Summary

- A. Section Includes:
  - 1. Multistage, pressure-maintenance pumps.
- B. Related Section:
  - 1. Section 213900 "Controllers for Fire-Pump Drivers" for pressure-maintenance- pump controllers.

1.03 Performance requirements

- A. Pump Equipment, Accessory, and Specialty Pressure Rating: 175 psig minimum unless higher pressure rating is indicated.

1.04 Action submittals

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, performance curves, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: For pumps, accessories, and specialties. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 2. Wiring Diagrams: For power, signal, and control wiring.

1.05 Informational submittals

- A. Field quality-control reports.

1.06 Closeout submittals

- A. Operation and Maintenance Data: For pumps to include in operation and maintenance manuals.



1.07 Quality assurance

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.08 Coordination

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.

PART 2 – PRODUCTS: For further development after award of project

PART 3 – EXECUTION: For further development after award of project

END OF SECTION 21 34 00



SECTION 21 39 00

CONTROLLERS FOR FIRE-PUMP DRIVERS

PART 1 - GENERAL

- 1.01 Related documents
  - A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- 1.02 Summary
- 1.03 Definitions
- 1.04 Performance requirements
- 1.05 Action submittals
  - A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
  - B. Shop Drawings: For each type of product indicated. Include dimensioned plans, elevations, sections, details, and attachments to other work, including required clearances and service spaces around controller enclosures.
    - 1. Show tabulations of the following:
      - a. Each installed unit's type and details.
      - b. Enclosure types and details for types other than NEMA 250, Type 2.
      - c. Factory-installed devices.
      - d. Nameplate legends.
      - e. Short-circuit current (withstand) rating of integrated unit.
      - f. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices.
      - g. Specified modifications.
    - 2. Detail equipment assemblies and indicate dimensions, weights, loads, method of field assembly, components, and location and size of each field connection.
    - 3. Schematic and Connection Diagrams: For power, signal, alarm, and control wiring and for pressure-sensing tubing.



1.06 Informational submittals

- A. Qualification Data: For qualified testing agency.
- B. Qualification Certificates: For each type of product indicated, from manufacturer.
  - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
  - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- C. Product Certificates: For each type of product indicated, from manufacturer.
- D. Manufacturer's factory test reports of fully assembled and tested equipment.
- E. Source quality-control reports.
- F. Field quality-control reports.

1.07 Closeout submittals

- A. Operation and Maintenance Data: For each type of product indicated to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
  - 1. Manufacturer's written instructions for setting field-adjustable timers, controls, and status and alarm points.
  - 2. Manufacturer's written instructions for testing, adjusting, and reprogramming microprocessor-based logic controls.

1.08 Maintenance material submittals

1.09 Quality assurance

- A. Testing Agency Qualifications: Member company of an NRTL.
- B. Source Limitations: Obtain fire-pump controllers and all associated equipment from single source or producer.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Comply with standards of authorities having jurisdiction pertaining to materials and installation.
- E. Comply with NFPA 20 and NFPA 70.



- F. IEEE Compliance: Fabricate and test enclosed controllers according to IEEE 344 to withstand seismic forces defined in Section 260548 "Vibration and Seismic Controls for Electrical Systems."

1.10 Delivery, storage, and handling

- A. Store controllers indoors in clean, dry space with uniform temperature to prevent condensation. Protect enclosed controllers from exposure to dirt, fumes, water, corrosive substances, and physical damage.
- B. If stored in areas subject to weather, protect controllers from weather, dirt, dust, corrosive substances, and physical damage. Remove loose packing and flammable materials from inside controllers; [install temporary electric heating, with at least 250 W per controller connect factory-installed space heaters to temporary electrical service.

1.11 Project conditions

- A. Environmental Limitations:
  - 1. Ambient Temperature Rating: Not less than 40 deg F and not exceeding 122 deg F unless otherwise indicated.
  - 2. Altitude Rating: Not exceeding 6600 feet unless otherwise indicated.

1.12 Coordination

- A. Coordinate layout and installation of controllers with other construction including conduit, piping, fire-pump equipment, and adjacent surfaces. Maintain required clearances for workspace and equipment access doors and panels. Ensure that controllers are within sight of fire-pump drivers.
- B. Coordinate sizes and locations of concrete bases with actual equipment provided.

PART 2 – PRODUCTS: For further development after Award of Project

PART 3 – EXECUTION: For further development after Award of Project

END OF SECTION 21 39 00



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SECTION 22 05 17

SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 GENERAL

1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 Summary

- A. Section Includes
  - :
  - 1. Sleeves
  - 2. Slack-sleeve fittings
  - 3. Sleeve-seal systems
  - 4. Sleeve-seal fittings
  - 5. Grout

1.03 Action Submittals

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.01 Sleeves

2.02 Stack-Sleeve Fittings

2.03 Sleeve-Seal Systems

2.04 Sleeve-Seal Fittings

2.05 Grout

PART 3 - EXECUTION

3.01 Sleeve Installation

3.02 Stack-Sleeve-Fitting Installation



**Department of  
Design and  
Construction**

PIN: 8502020CR0040P-42P  
Outline Specification

3.03 Sleeve-Seal-System Installation

3.04 Sleeve-Seal-Fitting Installation

3.05 Sleeve And Sleeve-Seal Schedule

END OF SECTION 22 05 17





SECTION 22 05 18

ESCUTCHEONS FOR PLUMBING PIPING

PART 1 - GENERAL

1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 Summary

- A. Section Includes:
  - 1. Escutcheons
  - 2. Floorplates.

1.03 Action Submittals

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.01 Escutcheons

2.02 Floor Plates

PART 3 - EXECUTION

3.01 Installation

3.02 Field Quality Control

END OF SECTION 22 05 18



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SECTION 22 05 19

METERS AND GAGES FOR PLUMBING PIPING

PART 1 - GENERAL

1.01 Related Documents

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 Summary

A. Section Includes:

1. Bimetallic-actuated thermometers
2. Thermowells
3. Dial-type pressure gages
4. Gage Attachments
5. Test Plugs
6. Test-Plug kits
7. Sight flow indicators

B. Related Sections:

1. Section 221116 "Domestic Water Piping" for water meters inside the building

1.03 Action Submittals

- A. Product Data: For each type of product indicated.

1.04 Informational Submittals

- A. Product Certificates: For Each type of meter and gage; from manufacturer

1.05 Closeout Submittals

- A. Operation and Maintenance Data: For meters and gages to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.01 Bimetallic-Actuated Thermometers

2.02 Thermowells

2.03 Pressure Gages

2.04 Gage Attachments



- 2.05 Test Plugs
- 2.06 Test-Plug Kits
- 2.07 Sight Flow Indicators

**PART 3 - EXECUTION**

- 3.01 Installation
- 3.02 Connections
- 3.03 Adjusting
- 3.04 Thermometer Schedule
- 3.05 Thermometer Scale-Range Schedule
- 3.06 Pressure-Gage Schedule
- 3.07 Pressure-Gage Scale-Range Schedule

END OF SECTION 22 05 19



SECTION 22 05 23

GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 GENERAL

1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 Summary

A. Section Includes:

1. Bronze angle valves.
2. Bronze ball valves.
3. Iron, single-flange butterfly valves.
4. Iron, grooved-end butterfly valves.
5. Bronze lift check valves.
6. Bronze swing check valves.
7. Iron gate valves.
8. Bronze globe valves.
9. Lubricated plug valves.
10. Chainwheels.

B. Related Sections:

1. Section 220553 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.
2. Section 221116 "Domestic Water Piping" for valves applicable only to this piping.
3. Section 221319 "Sanitary Waste Piping Specialties" for valves applicable only to this piping.

1.03 Definitions



1.04 ACTION SUBMITTALS

- A. Product Data: For each type of valve indicated.

1.05 Quality Assurance

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
  - 1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
  - 2. ASME B31.1 for power piping valves.
  - 3. ASME B31.9 for building services piping valves.
- C. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.06 Delivery, Storage, And Handling

- A. Prepare valves for shipping as follows:
  - 1. Protect internal parts against rust and corrosion.
  - 2. Protect threads, flange faces, grooves, and weld ends.
  - 3. Set angle, gate, and globe valves closed to prevent rattling.
  - 4. Set ball and plug valves open to minimize exposure of functional surfaces.
  - 5. Set butterfly valves closed or slightly open.
  - 6. Block check valves in either closed or open position.
- B. Use the following precautions during storage:
  - 1. Maintain valve end protection.
  - 2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 – PRODUCTS: For Further development after Award of Project



PART 3 - EXECUTION

- 3.01 Examination
- 3.02 Valve Installation
- 3.03 Adjusting
- 3.04 General Requirements For Valve Applications
- 3.05 Domestic, Hot- And Cold-Water Valve Schedule (Lead-Free Models Only)

END OF SECTION 22 05 23



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SECTION 22 05 29

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 Summary

- A. Section Includes:
  - 1. Metal pipe hangers and supports.
  - 2. Trapeze pipe hangers.
  - 3. Metal framing systems.
  - 4. Thermal-hanger shield inserts.
  - 5. Fastener systems.
  - 6. Pipe stands.
  - 7. Pipe positioning systems.
  - 8. Equipment supports.

1.03 Definitions

1.04 Performance Requirements

- A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.

1.05 Action Submittals

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication and installation details and include calculations for the following: include Product Data for components:



1. Trapeze pipe hangers.
  2. Metal framing systems.
  3. Pipe stands.
  4. Equipment supports.
- C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- D. Detail fabrication and assembly of trapeze hangers
- E. Design Calculations: Calculate requirements for designing trapeze hangers

## PART 2 - PRODUCTS

- 2.01 Metal Pipe Hangers And Supports
- 2.02 Trapeze Pipe Hangers
- 2.03 Metal Framing Systems
- 2.04 Thermal-Hanger Shield Inserts
- 2.05 Systems
- 2.06 Pipe Stands
- 2.07 Pipe Positioning Systems
- 2.08 Equipment Supports
- 2.09 Miscellaneous Materials

## PART 3 - Execution

- 3.01 Hanger And Support Installation
- 3.02 Equipment Supports
- 3.03 Metal Fabrications
- 3.04 Adjusting
- 3.05 Painting
- 3.06 Hanger And Support Schedule

END OF SECTION 22 05 29



SECTION 22 05 33

HEAT TRACING FOR PLUMBING PIPING

PART 1 GENERAL

1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 Summary

- A. Section includes plumbing piping heat tracing for freeze prevention, snow and ice melting on roofs and in gutters and downspouts with the following electric heating cables:

- 1. Constant wattage.

1.03 Action Submittals

- A. Product Data: For each type of product.

- 1. Include rated capacities, operating characteristics, and furnished specialties and accessories.
- 2. Schedule heating capacity, length of cable, spacing, and electrical power requirement for each electric heating cable required.

- B. Shop Drawings: For electric heating cable.

- 1. Include plans, elevations, sections, and attachment details.
- 2. Include diagrams for power, signal, and control wiring.

1.04 Informational Submittals

- A. Field quality-control reports.
- B. Sample Warranty: For special warranty.

1.05 Closeout Submittals

- A. Operation and Maintenance Data: For electric heating cables to include in operation and maintenance manuals.

1.06 Warranty



PART 2 PRODUCTS

- 2.01 Constant-Wattage Heating Cables
- 2.02 Accessories

PART 3 EXECUTION

- 3.01 Examination
- 3.02 Applications
- 3.03 Installation
- 3.04 Connections
- 3.05 Field Quality Control
- 3.06 Protection

END OF SECTION 22 05 33



SECTION 22 05 53

IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 Summary

- A. Section Includes:
  - 1. Equipment labels.
  - 2. Warning signs and labels.
  - 3. Pipe labels.
  - 4. Stencils.
  - 5. Valve tags.
  - 6. Warning tags.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

1.04 Coordination

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.



- C. Install identifying devices before installing acoustical ceilings and similar concealment.

**PART 2 - PRODUCTS**

- 2.01 Equipment Labels
- 2.02 Warning Signs And Labels
- 2.03 Pipe Labels
- 2.04 Stencils
- 2.05 Valve Tags
- 2.06 Warning Tags

**PART 3 - EXECUTION**

- 3.01 Preparation
- 3.02 Equipment Label Installation
- 3.03 Pipe Label Installation
- 3.04 Valve-Tag Installation
- 3.05 Warning-Tag Installation

END OF SECTION 22 05 53



SECTION 22 07 19

PLUMBING PIPING INSULATION

PART 1 GENERAL

1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 Summary

- A. Section includes insulating the following plumbing piping services:
  - 1. Domestic cold-water piping.
  - 2. Domestic hot-water piping.
  - 3. Roof drains and rainwater leaders.

1.03 Action Submittals

- A. Product Data: For each type of product indicated. Include thermal conductivity, water- vapor permeance thickness, and jackets both factory- and field-applied, if any.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
  - 1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
  - 2. Detail attachment and covering of heat tracing inside insulation.
  - 3. Detail insulation application at pipe expansion joints for each type of insulation.
  - 4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
  - 5. Detail removable insulation at piping specialties, equipment connections, and access panels.
  - 6. Detail application of field-applied jackets.
  - 7. Detail application at linkages of control devices.
- C. Samples: For each type of insulation and jacket indicated. Identify each Sample, describing product and intended use. Sample sizes are as follows:
  - 1. Preformed Pipe Insulation Materials: 12 inches long by NPS 2.



2. Jacket Materials for Pipe: 12 inches long by NPS 2.
3. Sheet Jacket Materials: 12 inches square.
4. Manufacturer's Color Charts: For products where color is specified, show the full range of colors available for each type of finish material.

#### 1.04 Informational Submittals

- A. Qualification Data: For qualified Installer.
- B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.
- C. Field quality-control reports.

#### 1.05 Quality Assurance

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
  1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke- developed index of 50 or less.
  2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke- developed index of 150 or less.
- C. Mockups: Before installing insulation, build mockups for each type of insulation and finish listed below to demonstrate quality of insulation application and finishes. Build mockups in the location indicated or, if not indicated, as directed by Architect. Use materials indicated for the completed Work.
  1. Piping Mockups:
    - a. One 10-foot section of NPS 2 straight pipe.
    - b. One each of a 90-degree threaded, welded, and flanged elbow.
    - c. One each of a threaded, welded, and flanged tee fitting.
    - d. One NPS 2 or smaller valve, and one NPS 2-1/2 or larger valve.
    - e. Four support hangers including hanger shield and insert.
    - f. One threaded strainer and one flanged strainer with removable portion of insulation.
    - g. One threaded reducer and one welded reducer.





- h. One pressure temperature tap.
- i. One mechanical coupling.

- 2. For each mockup, fabricate cutaway sections to allow observation of application details for insulation materials, adhesives, mastics, attachments, and jackets.
  - 3. Notify Architect seven days in advance of dates and times when mockups will be constructed.
  - 4. Obtain Architect's approval of mockups before starting insulation application.
  - 5. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  - 7. Demolish and remove mockups when directed.
- D. Comply with the following applicable standards and other requirements specified for miscellaneous components:
- 1. Supply and Drain Protective Shielding Guards: ICC A117.1.

#### 1.06 Delivery, Storage, And Handling

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

#### 1.07 Coordination

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

#### 1.08 Scheduling

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.



## PART 2 - PRODUCTS

- 2.01 Insulation Materials
- 2.02 Insulating Cements
- 2.03 Adhesives
- 2.04 Mastics
- 2.05 Lagging Adhesives
- 2.06 Sealants
- 2.07 Factory-Applied Jackets
- 2.08 Field-Applied Cloths
- 2.09 Field-Applied Jackets
- 2.10 Tapes
- 2.11 Securements
- 2.12 Protective Shielding Guards

## PART 3 - EXECUTION

- 3.01 Examination
- 3.02 Preparation
- 3.03 General Installation Requirements
- 3.04 Penetrations
- 3.05 Installation Of Flexible Elastomeric Insulation
- 3.06 Installation Of Mineral-Fiber Insulation
- 3.07 Field-Applied Jacket Installation
- 3.08 Finishes
- 3.09 Field Quality Control
- 3.10 Piping Insulation Schedule, General
- 3.11 Indoor Piping Insulation Schedule
- 3.12 Indoor, Field-Applied Jacket Schedule

END OF SECTION 22 07 19



SECTION 22 09 19  
DOMESTIC-WATER SYSTEM PUMPS

PART 1 GENERAL

1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 Summary

- A. Section Includes:

- 1. Duplex Constant Pressure Domestic Water System Pumps (See Schedule and detail).

1.03 Definitions

1.04 Performance Requirements

1.05 Action Submittals

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, and dimensions of individual components and profiles.] [Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: For booster pumps. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 2. Wiring Diagrams: For power, signal, and control wiring.

1.06 Informational Submittals

- A. Seismic Qualification Certificates: For booster pumps, accessories, and components, from manufacturer.
  - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
  - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.



1.07 Closeout Submittals

- A. Operation and Maintenance Data: For booster pumps to include in emergency, operation, and maintenance manuals.

1.08 Quality Assurance

- A. Reference Standards:
  - 1. ANSI/ASHRAE 90A: Energy Conservation in New Building Design.
  - 2. ASME Section VIII: pressure Vessels; Boiler and Pressure Vessel Codes.
  - 3. Hydraulic Institute
  - 4. NEMA MG 1: Motors and Generators
  - 5. NFPA 70: National Electrical Code
  - 6. UL 508: Standard for Industrial Control Equipment
  - 7. UL 778: for motor-operated water pumps
- B. Manufacturing firms regularly engaged in manufacture of the material meeting all capacities and operating characteristics of the specified manufacturer's product whose products have been in satisfactory use, in similar service, for not less than ten (10) years. Manufacturer must be ISO 9000 certified.
- C. The system shall be independently Third Party labeled as a system suitable for the intended use by a Nationally Recognized Testing Laboratory (NRTL) such as UL or ETL, in accordance with OSHA Federal Regulations and NFPA Pamphlet 70, the National electric Code (NEC) Article 90-7.
- D. Factory Test: The booster system and its component parts shall undergo a hydrostatic pressure and complete operating flow test from zero to 100% design flow rate under the specified suction and net system pressure conditions. This flow rate under the specified suction and net system pressure conditions. This flow test shall be performed by supplying the control panel with the specified incoming voltage. Each pump's performance shall be tested over its full range of flow. All pressure regulators, pressure switches, and other devices shall be set, and functions verified. Components shall be tested for hydraulic shock, vibration, or excessive noise. Testing shall also include a hi—pot voltage test of the system. Any parts found to be defective must be replaced prior to shipment. Full documentation shall be maintained by the manufacturer showing flow rates, pressures and amp draws for future service and troubleshooting reference.
- E. Certification: The final system certification shall include copies of the independent Third-Party Certifications and test data as recorded by X-Y plotter. The specifying Engineer shall have the option to witness the test. The entire system shall be painted after testing.
- F. The manufacturer of packaged equipment shall be responsible for the complete pumping system and its satisfactory performance as described in this section and shall provide a written guarantee covering all the equipment as well as the system performance for 12 months from date of start-up, not exceeding 18 months from date of shipment. The services of a factory trained engineer shall be provided for start-up and instruction of maintenance personnel.
- G. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.



1.09 Delivery, Storage, And Handling

- A. Retain protective coatings and flange's protective covers during storage.

1.10 Coordination

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.

**PART 2 - PRODUCTS**

2.01 Manufacturers

2.02 Variable Speed, Constant Pressure, Triplex Booster Pumps

2.03 Motors

**PART 3 - EXECUTION**

3.01 Examination

3.02 Concrete Bases

3.03 Booster Pump Installation

3.04 Connections

3.05 Startup Service

3.06 Labeling And Identification

3.07 Demonstration

END OF SECTION 22 11 23.



**Department of  
Design and  
Construction**

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Outline Specification

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SECTION 22 11 13

FACILITY WATER DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Water Distribution shall be performed in accordance with Section 663 of the New York State Department of Transportation Standard Specifications, latest edition.
- C. All water distribution products and installation shall be in accordance with the City of New York Department of Environmental Protection Bureau of Water and Sewer Operations - Standard Sewer and Water Main Specifications.

1.2 SUMMARY

- A. This Section includes water-distribution piping and related components outside the building for water service and fire-service mains.
- B. Related Sections include the following:
  - 1. Division 01 Section "Construction Waste Management"
  - 2. Division 31 Section "Dewatering" for dewatering excavations.
  - 3. Division 31 Section "Excavation Support and Protection" for excavation support and protection.
  - 4. Division 31 Section "Earth Moving" for excavating and backfilling.
- C. Utility-furnished products include water meters that will be furnished to the site, ready for installation. Meters will be furnished by the New York City Water Board. The Contractor shall coordinate with utility for installation of meters.
- D. The Site subcontractor shall install all water main and service work to within 5 feet of the proposed buildings. The plumbing subcontractor will complete the work into the buildings.
- E. Contractor shall obtain permits required for all on-site plumbing work from New York City. All work shall be in conformance with the New York City Plumbing Code.

1.3 SUBMITTALS

- A. Product Data: For each type of product to be used including fittings, ductile iron main, copper tubing, connections, valves, etc.
- B. Field quality-control test reports.



- C. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

#### 1.4 QUALITY ASSURANCE

##### A. Regulatory Requirements:

1. Comply with requirements of the New York City Department of Environmental Protection. Include tapping of water mains and backflow prevention.
2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.

##### B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

- C. NFPA Compliance: Comply with FDNY and NFPA 24 requirements for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

##### A. Preparation for Transport: Prepare valves according to the following:

1. Ensure that valves are dry and internally protected against rust and corrosion.
2. Protect valves against damage to threaded ends and flange faces.
3. Set valves in best position for handling. Set valves closed to prevent rattling.

##### B. During Storage: Use precautions for valves according to the following:

1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.

##### C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

##### D. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

##### E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.

##### F. Protect flanges, fittings, and specialties from moisture and dirt.





## 1.6 PROJECT CONDITIONS

- A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:
1. Notify Construction Manager no fewer than two days in advance of proposed interruption of service.
  2. Do not proceed with interruption of water-distribution service without Construction Manager's written permission.

## 1.7 COORDINATION

- A. Coordinate connection to water main with the New York City Department of Environmental Protection – Bureau of Water and Sewer Operations..

## PART 2 - PRODUCTS

### 2.1 COPPER TUBE AND FITTINGS

- A. Soft Copper Tube: ASTM B 88, Type K, water tube, annealed temper.
1. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
  2. Copper, Pressure-Seal Fittings:
    - a. NPS 2 and Smaller: Wrought-copper fitting with EPDM O-ring seal in each end.
    - b. NPS 2-1/2 to NPS 4: Bronze fitting with stainless-steel grip ring and EPDM O-ring seal in each end.
- B. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if required to match piping.
- C. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

### 2.2 DUCTILE-IRON PIPE AND FITTINGS

- A. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell and plain spigot end unless grooved or flanged ends are indicated.
1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
  2. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.
- B. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, with push-on-joint bell and plain spigot end unless grooved or flanged ends are indicated.



1. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
  2. Gaskets: AWWA C111, rubber.
- C. Flanges: ASME 16.1, Class 125, cast iron.
1. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
    - a. Gaskets: AWWA C111, rubber.
  2. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
    - a. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

## 2.3 JOINING MATERIALS

- A. Plastic Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

## 2.4 GATE VALVES

- A. AWWA, Cast-Iron Gate Valves:

1. Nonrising-Stem, Metal-Seated Gate Valves:
  - a. Description: Gray- or ductile-iron body and bonnet; with cast-iron or bronze double-disc gate, bronze gate rings, bronze stem, and stem nut.
    - 1) Standard: AWWA C500.
    - 2) Minimum Pressure Rating: 200 psig.
    - 3) End Connections: Mechanical joint.
    - 4) Interior Coating: Complying with AWWA C550.
2. Nonrising-Stem, Resilient-Seated Gate Valves:
  - a. Description: Gray- or ductile-iron body and bonnet; with bronze or gray- or ductile-iron gate, resilient seats, bronze stem, and stem nut.
    - 1) Standard: AWWA C509.
    - 2) Minimum Pressure Rating: 200 psig.
    - 3) End Connections: Mechanical joint.
    - 4) Interior Coating: Complying with AWWA C550.



## 2.5 GATE VALVE ACCESSORIES AND SPECIALTIES

### A. Tapping-Sleeve Assemblies:

1. Description: Sleeve and valve compatible with drilling machine.
  - a. Standard: MSS SP-60.
  - b. Tapping Sleeve: Cast- or ductile-iron or stainless steel, two-piece bolted sleeve with flanged outlet for new branch connection. Include sleeve matching size and type of pipe material being tapped and with recessed flange for branch valve.
  - c. Valve: AWWA, cast-iron, nonrising-stem, resilient-seated gate valve with one raised face flange mating tapping-sleeve flange.

### B. Valve Boxes: Comply with AWWA M44 for cast-iron valve boxes. Include top section, adjustable extension of length required for depth of burial of valve, plug with lettering "WATER," and bottom section with base that fits over valve and with a barrel approximately 5 inches in diameter.

1. Operating Wrenches: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.

### C. Indicator Posts: UL 789, FMG-approved, vertical-type, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of burial of valve.

## 2.6 CORPORATION VALVES AND CURB VALVES

### A. Service-Saddle Assemblies: Comply with AWWA C800. Include saddle and valve compatible with tapping machine.

1. Service Saddle: Copper alloy with seal and AWWA C800, threaded outlet for corporation valve.
2. Corporation Valve: Bronze body and ground-key plug, with AWWA C800, threaded inlet and outlet matching service piping material.

### B. Curb Valves: Comply with AWWA C800. Include bronze body, ground-key plug or ball, and wide tee head, with inlet and outlet matching service-piping material.

### C. Service Boxes for Curb Valves: Similar to AWWA M44 requirements for cast-iron valve boxes. Include cast-iron telescoping top section of length required for depth of burial of valve, plug with lettering "WATER, or as shown on the project drawings" and bottom section with base that fits over curb valve and with a barrel approximately 3 inches in diameter.

1. Shutoff Rods: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and slotted end matching curb valve.

## 2.7 WATER METERS

### A. Water meters will be furnished by NYCDEP.



## 2.8 FIRE HYDRANTS

### A. Dry-Barrel Fire Hydrants:

1. Description: Freestanding, with one NPS 4-1/2 and two NPS 2-1/2 outlets, 5-1/4-inch main valve, drain valve, and NPS 6 mechanical-joint inlet. Include interior coating according to AWWA C550. Hydrant shall have cast-iron body, compression-type valve opening against pressure and closing with pressure.
  - a. Standard: AWWA C502.
  - b. Pressure Rating: 150 psig minimum.
  - c. Outlet Threads: NFPA 1963, with external hose thread used by local fire department. Include cast-iron caps with steel chains.
  - d. Operating and Cap Nuts: Pentagon, 1-1/2 inches point to flat.
  - e. Direction of Opening: Open hydrant valve by turning operating nut to left or counterclockwise.
  - f. Exterior Finish: Red alkyd-gloss enamel paint, unless otherwise indicated.

## PART 3 - EXECUTION

### 3.1 EARTHWORK

- A. Refer to Division 31 Section "Earth Moving" for excavating, trenching, and backfilling.

### 3.2 PIPING APPLICATIONS

- A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.
- B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.
- C. Do not use flanges or unions for underground piping.
- D. Flanges, unions, grooved-end-pipe couplings, and special fittings may be used, instead of joints indicated, on aboveground piping and piping in vaults.
- E. Underground water-service piping NPS 3/4 to NPS 3 shall be the following:
  1. Soft copper tube, ASTM B 88, Type K; wrought-copper, solder-joint fittings; and brazed copper, pressure-seal fittings; and pressure-sealed joints.
- F. Underground water-service main piping, 8" shall be the following:
  1. Ductile-iron, push-on-joint pipe; ductile-iron, push-on-joint fittings; and gasketed mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.
- G. Underground Fire-Service-Main Piping NPS 4 to NPS 12 shall be the following:



1. Ductile-iron, push-on-joint pipe; ductile-iron, push-on-joint fittings; and gasketed and mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.

### 3.3 VALVE APPLICATIONS

- A. General Application: Use mechanical-joint-end valves for NPS 3 and larger underground installation. Use threaded- or flanged-end valves for installation in vaults. Use UL/FMG, nonrising-stem gate valves for installation with indicator posts. Use corporation valves and curb valves with ends compatible with piping, for NPS 2 and smaller installation.
- B. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
  1. Underground Valves, NPS 3 and Larger: AWWA, cast-iron, nonrising-stem, resilient -seated gate valves with valve box.
  2. Use the following for valves in vaults and aboveground:
    - a. Gate Valves, NPS 2 and Smaller: Bronze, rising stem.
    - b. Gate Valves, NPS 3 and Larger: AWWA, cast iron, OS&Y rising stem, resilient seated.
    - c. Check Valves: AWWA C508, swing type.

### 3.4 PIPING INSTALLATION

- A. Water-Main Connection: Tap water main according to requirements of water utility company and of size and in location indicated.
- B. Make connections larger than NPS 2 with tapping machine according to the following:
  1. Install tapping sleeve and tapping valve according to MSS SP-60.
  2. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.
  3. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water-service piping.
  4. Install gate valve onto tapping sleeve. Comply with MSS SP-60. Install valve with stem pointing up and with valve box.
- C. Install ductile-iron, water-service piping according to AWWA C600 and AWWA M41.
- D. Bury piping with depth of cover over top at least 60 inches.
- E. Extend water-service piping and connect to water-supply source and building-water-piping systems at outside face of building wall in locations and pipe sizes indicated.
  1. Terminate water-service piping at building wall until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building-water-piping systems when those systems are installed.
- F. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.



### 3.5 JOINT CONSTRUCTION

- A. Make pipe joints according to the following:
  - 1. Copper-Tubing, Pressure-Sealed Joints: Use proprietary crimping tool and procedure recommended by copper, pressure-seal-fitting manufacturer.
  - 2. Ductile-Iron Piping, Gasketed Joints for Water-Service Piping: AWWA C600 and AWWA M41.
  - 3. Ductile-Iron Piping, Gasketed Joints for Fire-Service-Main Piping: UL 194.

### 3.6 ANCHORAGE INSTALLATION

- A. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
  - 1. Gasketed-Joint, Ductile-Iron, Water-Service Piping: According to AWWA C600.
  - 2. Fire-Service-Main Piping: According to NFPA 24.
- B. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

### 3.7 VALVE INSTALLATION

- A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.
- B. AWWA Valves Other Than Gate Valves: Comply with AWWA C600 and AWWA M44.
- C. UL/FMG, Gate Valves: Comply with NFPA 24. Install each underground valve and valves in vaults with stem pointing up and with vertical cast-iron indicator post.
- D. Corporation Valves and Curb Valves: Install each underground curb valve with head pointed up and with service box.

### 3.8 WATER METER INSTALLATION

- A. Install water meters, piping, and specialties according to utility company's written instructions.

### 3.9 ROUGHING-IN FOR WATER METERS

- A. Rough-in piping and specialties for water meter installation according to utility company's written instructions.

### 3.10 FIRE HYDRANT INSTALLATION

- A. General: Install each fire hydrant with separate gate valve in supply pipe, anchor with restrained joints or thrust blocks, and support in upright position.



- B. Wet-Barrel Fire Hydrants: Install with valve below frost line. Provide for drainage.
- C. AWWA Fire Hydrants: Comply with AWWA M17.
- D. UL/FMG Fire Hydrants: Comply with NFPA 24.

### 3.11 CONNECTIONS

- A. Piping installation requirements are specified in other Division 31 and Division 33 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect water-distribution piping to utility water main.

### 3.12 FIELD QUALITY CONTROL

- A. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.
- B. Hydrostatic Tests: Test at not less than one-and-one-half times working pressure for two hours.
  - 1. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig. Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.
- C. Prepare reports of testing activities.
- D. Conduct all tests as required by the New York City Department of Environmental Protection, Fire Department of New York, and other authorities having jurisdiction..

### 3.13 CLEANING

- A. Clean and disinfect water-distribution piping as follows:
  - 1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
  - 2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.
  - 3. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:
    - a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.



- b. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
  - c. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.
- B. Prepare reports of purging and disinfecting activities.

END OF SECTION 22 11 13





SECTION 22 11 16  
DOMESTIC WATER PIPING

**PART 1 GENERAL**

**1.01 Related Documents**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specifications Sections, apply to this Section.

**1.02 Summary**

**A. Section Includes:**

- 1. Under building slab and aboveground domestic water pipes, tubes, and fittings inside buildings.

**B. Related Requirements**

- 1. Section 221113 – “Facility Water Distribution Piping” for water service piping and water meters outside the building from source to the point where water service piping enters the building.

**1.03 Action Submittals**

- A. Product Data: For transition fittings and dielectric fittings

**1.04 INFORMATIONAL SUBMITTALS**

- A. System purging and disinfecting activities report
- B. Field quality control reports

**PART 2 - PRODUCTS**

**2.01 Piping Materials**

**2.02 Copper Tube And Fittings**

**2.03 Ductile-Iron Pipe And Fittings (For Incoming Service Only)**

**2.04 Piping Joining Materials**

**2.05 Transition Fittings**

**2.06 Dielectric Fittings**



**PART 3 - EXECUTION**

- 3.01 Earthwork
- 3.02 Piping Installation
- 3.03 Joint Construction
- 3.04 Transition Fitting Installation
- 3.05 Dielectric Fitting Installation
- 3.06 Hanger And Support Installation
- 3.07 Connections
- 3.08 Identification
- 3.09 Field Quality Control
- 3.10 Adjusting
- 3.11 Cleaning
- 3.12 Piping Schedule
- 3.13 Valve Schedule

END OF SECTION 22 11 16



SECTION 22 11 17  
GRAY WATER PIPING

**PART 1 GENERAL**

**1.01 Related Documents**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.02 Summary**

- A. Section Includes:
  - 1. Under-building-slab and aboveground gray-water pipes, tubes, and fittings inside buildings.
  - 2. Encasement for piping.

**1.03 Action Submittals**

- A. Product Data: For each type of product.
  - 1. Pipes, tubes, fittings, and specialties for each type of piping.
  - 2. Joining materials.
  - 3. Encasement for piping.
  - 4. Transition fittings.
  - 5. Dielectric fittings.
- B. Sustainable Design Submittals:
  - 1. Product Data: For adhesives, indicating VOC content.

**1.04 Informational Submittals**

- A. Field quality-control reports.

**PART 2 PRODUCTS**

- 2.01 Performance Requirements
- 2.02 Copper Tube And Fittings
- 2.03 PVC Water Pipe And Fittings
- 2.04 PP Pipe And Fittings
- 2.05 Piping Joining Materials
- 2.06 Transition Fittings
- 2.07 Dielectric Fittings



PART 3 EXECUTION

- 3.01 Examination
- 3.02 Piping Installation
- 3.03 Water Pipe Joint Connections
- 3.04 Transition Fitting Installation
- 3.05 Valve Installation
- 3.06 Hanger And Support Installation For Water Piping
- 3.07 Identification
- 3.08 Field Quality Control
- 3.09 Adjusting
- 3.10 Gray-Water Piping Schedule
- 3.11 Valve Schedule

END OF SECTION 22 11 17



SECTION 22 11 19

DOMESTIC WATER PIPING SPECIALTIES

PART 1 GENERAL

1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 Summary

A. Section Includes:

1. Vacuum breakers.
2. Backflow preventers.
3. Water pressure-reducing valves.
4. Balancing valves.
5. Strainers.
6. Hose bibbs.
7. Wall hydrants.
8. Drain valves.
9. Water-hammer arresters.
10. Air vents.
11. Trap-Seal Primer Device
12. Flexible connectors.

B. Related Requirements:

1. Section 220519 "Meters and Gages for Plumbing Piping" for thermometers, pressure gages, and flow meters in domestic water piping.

1.03 Action Submittals

- A. Product Data: For each type of product.



- B. Shop Drawings: For domestic water piping specialties.
  - 1. Include diagrams for power, signal, and control wiring.

1.04 Informational Submittals

- A. Field quality control reports

1.05 Closeout Submittals

- A. Operation and Maintenance Data: for domestic water piping specialties to include in emergency, operation and maintenance manuals.

**PART 2 – PRODUCTS**

- 2.01 General Requirements For Piping Specialties
- 2.02 Performance Requirements
- 2.03 Vacuum Breakers
- 2.04 Backflow Preventers
- 2.05 Water Pressure-Reducing Valves
- 2.06 Strainers For Domestic Water Piping
- 2.07 Hose Bibbs
- 2.08 Wall Hydrants
- 2.09 Drain Valves
- 2.10 Water-Hammer Arresters
- 2.11 Air Vents

**PART 3 - EXECUTION**

- 3.01 Installation
- 3.02 Labeling And Identifying
- 3.03 Adjusting

END OF SECTION 22 11 19



SECTION 22 13 13

FACILITY SANITARY SEWERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Sanitary Sewerage shall be performed in accordance with Section 664 of the New York State Department of Transportation Standard Specifications, latest edition.
- C. All sanitary sewer products and installation shall be in accordance with the City of New York Department of Environmental Protection Bureau of Water and Sewer Operations - Standard Sewer and Water Main Specifications.

1.2 RELATED WORK

- A. Related Sections include the following:
  - 1. Division 01 Section "Construction Waste Management"

1.3 SUMMARY

- A. This Section includes nonpressure gravity-flow and pressure force-main sanitary sewerage outside the building, with the following components:
  - 1. Cleanouts;
  - 2. Sanitary Sewer Gravity Pipe and Fittings;
  - 3. Sanitary Sewer Manholes & Structures
- B. The site subcontractor shall install all required piping, fittings, etc. to within 5 feet of the proposed buildings. The plumbing subcontractor will complete all sanitary sewer work within the buildings and will connect to the pipe stub outside of the buildings.
- C. Contractor shall obtain permits for all on-site plumbing work from The City of New York. All work shall be in conformance with the National Standard Plumbing Code, latest edition.

1.4 DEFINITIONS

- A. PVC: Polyvinyl chloride.

1.5 SUBMITTALS

- A. Product Data: For the following:



1. PVC Pipe Data;
2. Cleanouts;
- B. Shop Drawings: For the following:
  1. Manholes: Include plans, elevations, sections, details, and frames and covers. Include design calculations, and concrete design-mix report for cast-in-place manholes.
- C. Field quality-control test reports.
- 1.6 Field quality-control test reports.
- 1.7 PERFORMANCE REQUIREMENTS
  - A. Nonpressure Gravity-Flow Piping pressure rating of 10-foot head of water.
  - B. Flexible pipe deflection test
  - C. Air testing of gravity sewer
- 1.8 DELIVERY, STORAGE, AND HANDLING
  - A. Do not store plastic pipe and fittings in direct sunlight.
  - B. Protect pipe, pipe fittings, and seals from dirt and damage.
  - C. Handle manholes according to manufacturer's written rigging instructions.
- 1.9 PROJECT CONDITIONS
  - A. Interruption of Existing Sanitary Sewerage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
    1. Notify Owner and Construction Manager no fewer than two days in advance of proposed interruption of service.
    2. Do not proceed with interruption of service without written permission.
- 1.10 COORDINATION
  - A. Coordinate Work with termination of sanitary sewer system outside building, connection to downstream sanitary sewer and trenching.

## PART 2 - PRODUCTS

### 2.1 PIPING MATERIALS

- A. Refer to Part 3 "Piping Applications" Article for applications of pipe, fitting, and joining materials.





## 2.2 PVC PIPE AND FITTINGS

- A. PVC Service Lateral Pipe and Fittings: ASTM D 1785, Schedule 40 pipe, with plain ends for solvent-cemented joints with ASTM D 2466, Schedule 40, socket-type fittings.
- B. PVC Sewer Pipe and Fittings, NPS 15 and Smaller: ASTM D 3034, SDR 35, with bell-and-spigot ends for gasketed joints with ASTM F 477, elastomeric seals.

## 2.3 CLEANOUTS

- A. PVC Cleanouts: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.
- B. Access frames and covers shall be provided.

## 2.4 MANHOLES

- A. Standard Precast Concrete Manholes: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
  - 1. Diameter: 48 inches minimum, unless otherwise indicated.
  - 2. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
  - 3. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
  - 4. Riser Sections: 4-inch minimum thickness, and of length to provide depth indicated.
  - 5. Top Section: Eccentric-cone type, unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
  - 6. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
  - 7. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
  - 8. Steps: Individual polypropylene steps with a 5/8 inch Grade 60 steel reinforcement, wide enough to allow worker to place both feet on 1 step and designed to prevent lateral slippage off of step. Cast or anchor steps into sidewalls beginning 2 feet above the bottom, and spaced not more than 12 inches center to center.
  - 9. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, to match diameter of manhole frame and cover.
  - 10. Protective Coating: Plant-applied, SSPC-Paint 16, coal-tar, epoxy-polyamide paint; 10-mil minimum thickness applied to exterior and interior surfaces.



11. Manhole Frames and Covers: Ferrous; 24-inch ID by 7- to 9-inch riser with 4-inch- minimum width flange and 26-inch- diameter cover. Include indented top design with lettering cast into cover, using wording as shown on the project drawings.
  - a. Material: ASTM A 48/A 48M, Class 35 gray iron, unless otherwise indicated.
  - b. Protective Coating: Foundry-applied, SSPC-Paint 16, coal-tar, epoxy-polyamide paint.

## 2.5 CONCRETE

- A. General: Cast-in-place concrete according to ACI 318/318R, ACI 350R, and the following:
  1. Cement: ASTM C 150, Type II.
  2. Fine Aggregate: ASTM C 33, sand.
  3. Coarse Aggregate: ASTM C 33, crushed gravel.
  4. Water: Potable.
- B. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water/cementitious materials ratio.
  1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
  2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60, deformed steel.

## PART 3 - EXECUTION

### 3.1 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Section "Earthwork."

### 3.2 PIPING APPLICATIONS

- A. Pipe couplings and special pipe fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.
  1. Use nonpressure-type flexible couplings where required to join gravity-flow, nonpressure sewer piping, unless otherwise indicated.
    - a. Flexible couplings for same or minor difference OD pipes.
    - b. Unshielded, increaser/reducer-pattern, flexible couplings for pipes with different OD.
    - c. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.



- B. Gravity-Flow, Nonpressure Sewer Piping: Use the following pipe materials for each size range:
  - 1. PVC, Schedule 40, sewer pipe and fittings; gaskets; and gasketed joints.

### 3.3 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground sanitary sewerage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction, unless fittings are indicated. Use fittings for branch connections, unless direct tap into existing sewer is indicated.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. Install gravity-flow, nonpressure, drainage piping according to the following:
  - 1. Install piping below frost line.
  - 2. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.
- F. Clean interior of piping and manholes of dirt and superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed. Place plug in end of incomplete piping at end of day and when work stops.

### 3.4 PIPE JOINT CONSTRUCTION

- A. Where specific joint construction is not indicated, follow piping manufacturer's written instructions.
- B. Join gravity-flow, nonpressure, drainage piping according to the following:
  - 1. Join PVC sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasket joints.

### 3.5 MANHOLE INSTALLATION

- A. General: Install manholes complete with appurtenances and accessories indicated.
- B. Install precast concrete manhole sections with sealants according to ASTM C 891.
- C. Form continuous concrete channels and benches between inlets and outlet.
- D. Set tops of frames and covers flush with finished surface of manholes that occur in pavements.



### 3.6 CONCRETE PLACEMENT

- A. Place cast-in-place concrete according to ACI 318/318R.

### 3.7 CLEANOUT INSTALLATION

- A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Install piping so cleanouts open in direction of flow in sewer pipe.
  - 1. Use heavy-duty, top-loading classification cleanouts.
- B. Set cleanout frames and covers in earth in cast-in-place-concrete block or pre-cast ring, 18 by 18 by 12 inches deep. Set with tops 1 inch above surrounding grade.
- C. In concrete pavement set cleanout frames and covers with tops flush with pavement surface.

### 3.8 CONNECTIONS

- A. Make connections to existing piping and underground manholes.
  - 1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
  - 2. Protect existing piping and manholes to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

### 3.9 CLOSING ABANDONED SANITARY SEWERAGE SYSTEMS

- A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:
  - 1. Close open ends of piping with at least 8-inch- thick, brick masonry bulkheads.
- B. Abandoned Manholes: Excavate around manhole as required and use either procedure below:
  - 1. Remove manhole and close open ends of remaining piping.
- C. Backfill to grade according to Division 2 Section "Earthwork."

### 3.10 FIELD QUALITY CONTROL

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
  - 1. Submit separate report for each system inspection.
  - 2. Defects requiring correction include the following:



- a. Alignment: Less than full diameter of inside of pipe is visible between structures.
  - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
  - c. Crushed, broken, cracked, or otherwise damaged piping.
  - d. Infiltration: Water leakage into piping.
  - e. Exfiltration: Water leakage from or around piping.
3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
  4. Reinspect and repeat procedure until results are satisfactory.
- B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
1. Do not enclose, cover, or put into service before inspection and approval.
  2. Test completed piping systems according to requirements of authorities having jurisdiction.
  3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
  4. Submit separate report for each test.
  5. Hydrostatic Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction and the following:
    - a. Allowable leakage is maximum of 100 gal./inch of nominal pipe size per mile of pipe, during 24-hour period.
    - b. Close openings in system and fill with water.
    - c. Purge air and refill with water.
    - d. Disconnect water supply.
    - e. Test and inspect joints for leaks.
  6. Air Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
    - a. Option: Test plastic gravity sewer piping according to ASTM F 1417.
    - b. Option: Test concrete gravity sewer piping according to ASTM C 924.
- C. Leaks and loss in test pressure constitute defects that must be repaired.



- D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.11 CLEANING

- A. Clean interior of piping of dirt and superfluous material. Flush with potable water.

3.12 AS-BUILT DRAWINGS

- A. CONTRACTOR shall submit as-built drawings to the OWNER of all sanitary sewer installed. No separate payment will be made for as-built drawings.

END OF SECTION 22 13 13



SECTION 22 13 16

SANITARY WASTE AND VENT PIPING

PART 1 – GENERAL

1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specifications Sections, apply to this Section.

1.02 Summary

A. Section Includes:

- 1. Pipe, tube, and fittings
- 2. Specialty pipe fittings

B. Related Sections

- 1. Section 221329 "Sump Pumps" for effluent and sewage pumps

1.03 PERFORMANCE REQUIREMENTS

- A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:

- 1. Soil, Waste, and Vent Piping: 10-foot head of water.

1.04 Action Submittals

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For sovent drainage system. Include plans, elevations, sections, and details.

1.05 INFORMATIONAL SUBMITTALS

- A. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
- B. Detailed description of piping anchorage devices on which the certification is based and their installation requirements.
- C. Field quality-control reports.

1.06 Quality Assurance

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.



**PART 2 – PRODUCTS**

- 2.01 Piping Materials
- 2.02 Hub-And-Spigot, Cast-Iron Soil Pipe And Fittings
- 2.03 Hubless, Cast-Iron Soil Pipe And Fittings
- 2.04 SPECIALTY PIPE FITTINGS

**PART 3 - EXECUTION**

- 3.01 Earth Moving
- 3.02 Piping Installation
- 3.03 Joint Construction
- 3.04 Specialty Pipe Fitting Installation
- 3.05 Valve Installation
- 3.06 Hanger And Support Installation
- 3.07 Connections
- 3.08 Identification
- 3.09 Field Quality Control
- 3.10 Cleaning And Protection
- 3.11 Piping Schedule

END OF SECTION 22 13 16





SECTION 22 13 19

SANITARY WASTE PIPING SPECIALTIES

PART 1 – GENERAL

1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section

1.02 Summary

A. Section Includes:

1. Cleanouts
2. Floor drains
3. Roof flashing assemblies
4. Through-penetration firestop assemblies
5. Miscellaneous sanitary drainage piping specialties
6. Flashing materials

B. Related Requirements

1. Section 221423 “Storm Drainage Piping” for storm drainage piping inside the building, drainage piping specialties, and drains.

1.03 Action Submittals

A. Shop Drawings: Show fabrication and installation details for frost-resistant vent terminals.

1. Wiring Diagrams: Power, signal, and control wiring.
  - a. The term “withstand” means “the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event”
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

B. Field quality-control reports.

1.04 Closeout Submittals

- A. Operation and Maintenance Data: For drainage piping specialties to include in emergency operation, and maintenance manuals.



1.05 Quality Assurance

- A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency
- B. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100 by a testing agency acceptable to authorities having jurisdiction and marked for intended use
- C. Comply with NSF 14, "Plastics Piping Components and Related Materials" for plastic sanitary piping specialty components.\

1.06 Coordination

- A. Coordinate size and location of concrete bases. Cast anchor bolts inserts into bases. Concrete reinforcement and formwork requirements are specified in Section 033000 "Cast-in Place Concrete", Section 033053 "Miscellaneous Cast-In Place Concrete"
- B. Coordinate size and location of roof penetrations.

1.07 Maintenance Material Submittals

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents
  - 1. Cultures: Provide 1-gal bottles of bacteria culture recommended by manufacturer of FOG disposal systems equal to 200 percent of amount installed, but no fewer than 2, 1-gal bottles..

**PART 2 - PRODUCTS**

- 2.01 Cleanouts
- 2.02 Floor Drains
- 2.03 Roof Flashing Assemblies
- 2.04 Through-Penetration Firestop Assemblies
- 2.05 Miscellaneous Sanitary Drainage Piping Specialties
- 2.06 Flashing Materials

**PART 3 - EXECUTION**

- 3.01 Installation
- 3.02 Connections
- 3.03 Flashing Installation
- 3.04 Labeling And Indentifying
- 3.05 Field Quality Control
- 3.06 Protection

END OF SECTION 22 13 19



SECTION 22 13 63  
GREY WATER STORAGE TANKS

PART 1 GENERAL

1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 Summary

- A. Section Includes:
  - 1. Steel, nonpressure, water storage tank.
  - 2. Plastic, nonpressure, water storage tanks

1.03 Action Submittals

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for grey-water storage tanks.
  - 2. Include rated capacities, operating characteristics, furnished specialties and accessories.
- B. Shop Drawings:
  - 1. Include plans, elevations, sections, and mounting details.
  - 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 3. Detail fabrication and assembly.
  - 4. Include diagrams for power, signal, and control wiring.
- C. Delegated-Design Submittal: For facility grey-water storage tanks.
  - 1. Include design calculations for selecting vibration isolators and designing vibration isolation bases.

1.04 Informational Submittals

- A. Qualification Data: For Manufacturer and or fabricator.



1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements

B. Welding certificates, if applicable.

#### 1.05 Closeout Submittals

A. Maintenance Data: For grey-water storage tanks to include in maintenance manuals.

#### 1.06 Quality Assurance

A. Fabricator Qualifications: Employ a qualified structural engineer to prepare calculations, Shop Drawings, and other structural data for fabrication and erection of surface water-storage tanks.

1. Engineering Responsibility: Preparation of data for surface water-storage tanks, accessories, specified appurtenances, and concrete supports and foundations, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Welding Qualifications/if applicable to tank construction: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
3. AWS D1.4/D1.4M, "Structural Welding Code - Reinforced Steel."

C. Pipe and Pressure-Vessel Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

### PART 2 PRODUCTS

2.01 Performance Requirements

2.02 Steel, Nonpressure, Water Storage Tanks

### PART 3 EXECUTION

3.01 Installation

3.02 Field Quality Control

END OF SECTION 22 13 63



SECTION 22 14 23  
STORM DRAINAGE PIPING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. The following documents apply to all required work for the Project: (1) the Contract Drawings, (2) the Specifications, (3) the General Conditions, (4) the Contract City of New York Standard Construction Contract.

1.02 SUMMARY

- A. Section Includes:
1. Roof drains.
  2. Miscellaneous storm drainage piping specialties.
  3. Cleanouts.
  4. Through-penetration firestop assemblies.
  5. Flashing materials.

1.03 SUSTAINABLE DESIGN REQUIREMENTS

- A. This project is targeting the goal of LEED Silver. The Contractor is required to follow the specified requirements and implement practices and procedures to meet the project's environmental performance goals.
- B. Refer to the following sections:
1. Section 01 74 19 "Construction Waste Management and Disposal"
  2. Section 01 81 13 "Sustainable Design Requirements for LEED Buildings"
  3. Section 01 81 19 "Indoor Air Quality Requirements for LEED Buildings"
- C. LEED BUILDING PERFORMANCE REQUIREMENTS: The following criteria are required for the products included in this section. Certification of these products shall be in accordance with the LEED Building Submittals requirements of this Section.
1. Adhesives, sealants, paints and coatings used for the work of this section shall meet the Volatile Organic Compound (VOC) limits specified in Section 01 81 13.13 – "Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints, and Coatings for LEED Buildings", where applicable. Certification of VOC content shall be in accordance with the LEED Building Submittals requirements of this section.

1.04 LEED BUILDING SUBMITTALS:



- A. The LEED BUILDING Submittal information shall be assembled into one package per specification section (or per subcontractor) and sent to the Commissioner for review.
  - 1. Refer to DDC General Conditions for LEED BUILDING Submittal requirements.

#### 1.05 SUBMITTAL PROCEDURES

- A. Refer to DDC General Conditions Section 01 33 00 "Submittal Procedures".

#### 1.06 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

#### 1.07 QUALITY ASSURANCE

- A. Refer to DDC General Conditions Section 01 40 00 "Quality Requirements".
- B. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.

### PART 2 PRODUCTS

- 2.01 Metal Roof Drains (See Schedule)
- 2.02 Miscellaneous Storm Drainage Piping Specialties
- 2.03 Cleanouts
- 2.04 Through-Penetration Firestop Assemblies
- 2.05 Flashing Materials

### PART 3 EXECUTION

- 3.01 Execution Requirements
- 3.02 Installation
- 3.03 Connections
- 3.04 Flashing Installation
- 3.05 Protection

END OF SECTION 22 14 23



SECTION 22 33 00  
ELECTRIC DOMESTIC WATER HEATERS

PART 1 GENERAL

1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 Summary

- A. Section Includes:
  - 1. Commercial, electric, domestic-water booster heaters.
  - 2. Commercial, electric, storage, domestic-water heaters.

1.03 Action Submittals

- A. Product Data: For each type and size of domestic-water heater indicated on plumbing schedule.
- B. Sustainable Design Submittals:
  - 1. Product Data: For energy efficiency.
- C. Shop Drawings:
  - 1. Wiring Diagrams: For power, signal, and control wiring.

1.04 Informational Submittals

- A. Product Certificates: For each type of electric, domestic-water heater, from manufacturer.
- B. Domestic-Water Heater Labeling: Certified and labeled by testing agency acceptable to authorities having jurisdiction.
- C. Source quality-control reports.
- D. Field quality-control reports.
- E. Warranty: Sample of special warranty.



**1.05** Closeout Submittals

- A. Operation and Maintenance Data: For electric, domestic-water heaters to include in emergency, operation, and maintenance manuals.

**1.06** Quality Assurance

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1
- C. ASME Compliance: Where ASME-code construction is indicated, fabricate and label commercial, domestic-water heater storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
- D. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61 Annex G, "Drinking Water System Components - Health Effects."

**1.07** Coordination

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.

**PART 2 PRODUCTS**

- 2.01 Commercial, Electric, Domestic-Water Heaters
- 2.02 Domestic-Water Heater Accessories
- 2.03 Source Quality Control

**PART 3 EXECUTION**

- 3.01 Domestic-Water Heater Installation
- 3.02 Connections
- 3.03 Identification
- 3.04 Field Quality Control

END OF SECTION 23 33 00





SECTION 22 43 00  
PLUMBING FIXTURES

PART 1 GENERAL

1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 Summary : All Plumbing fixture selections to be by Architect and submitted to Engineer for code compliance and LEED criteria.

- A. Refer to fixture schedule on drawings

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fixtures.
  - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. LEED Submittals:
  - 1. Product Data: Documentation indicating that flow and water consumption requirements comply with Prerequisite WE 1
- C. Shop Drawings: Include diagrams for power, signal, and control wiring.

1.04 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For plumbing fixtures and faucets to include in operation and maintenance manuals.

1.05 Maintenance Material Submittals

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Faucet Washers and O-Rings: Equal to 10 percent of amount of each type and size installed.
  - 2. Faucet Cartridges and O-Rings: Equal to 5 percent of amount of each type and size installed.



**PART 2 PRODUCTS**

- 2.01 Supply Fittings
- 2.02 Waste Fittings
- 2.03 Grout

**PART 3 EXECUTION**

- 3.01 Examination
- 3.02 Installation
- 3.03 Connections
- 3.04 Adjusting
- 3.05 Cleaning And Protection

END OF SECTION 22 43 00



SECTION 23 01 00

OPERATION AND MAINTENANCE OF HVAC SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide all operation and maintenance (O&M) instructions and manuals for HVAC systems and equipment as indicated and scheduled on the drawings and in accordance with the Contract Documents.
- B. Section includes:
  - 1. Operation and maintenance instructions.
  - 2. Operation and maintenance manuals.
  - 3. Recommended spare parts.
  - 4. Service contacts.

1.2 RELATED SECTIONS

- A. Refer to Divisions 01, 14, 21, 22, 26, 27 and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. Refer to Section 23 00 00.03 – Table of Contents for HVAC for specification sections that apply to all work herein.

1.3 REFERENCES

- A. Codes: Perform all work in accordance with the latest applicable codes and standards for New York City and New York State.
  - 1. Building Code of the State of New York.
  - 2. Mechanical Code of the State of New York.
  - 3. Energy Conservation Construction Code of New York State.
  - 4. New York City Building Code.
  - 5. New York City Energy Conservation Code
  - 6. New York City Mechanical Code.
  - 7. New York City Fuel Gas Code.
- B. Reference Standards: Perform work in accordance with, but not limited to, the following standards:
  - 1. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
    - a. ASHRAE Guideline 4: Preparation of Operating and Maintenance Documentation for Building Systems.
  - 2. International Electrical Testing Association (NETA)
    - a. ANSI/NETA MTS: Standard for Maintenance Testing Specifications for Electrical Power Equipment and Systems.

1.4 SUBMITTALS

- A. Submittals shall be furnished in accordance with the requirements of Section 23 00 00.
- B. Provide all testing and commissioning as required. Obtain all commissioning requirements from the Commissioning Provider/Owner/Agent.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. The O&M manuals shall be furnished as indicated in Paragraph 1.4, with a clearly defined table of contents and indexed section, and shall include the following documentation:



1. A document directory identifying each system and all associated equipment.
  2. Operating procedures for each system and all associated equipment.
  3. Manufacturer's maintenance procedures supplemented by project-specific information.
  4. Project-specific wiring diagrams for each piece of equipment.
  5. Troubleshooting procedures for each system and all associated equipment.
  6. Test reports.
  7. Emergency contact information.
- B. Separate manuals shall be provided for following systems and associated equipment:
1. Variable frequency motor controllers.
  2. Facility fuel oil systems.
  3. Air-side systems.
  4. Water-side systems.
  5. Automatic temperature control system.

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Submit an outline of the instruction programs and instruction manuals to the Owner or Owner's representative for his approval at least two (2) weeks prior to the proposed start date of the instruction sessions.

#### 3.2 INSTRUCTION OF OPERATING PERSONNEL

- A. Provide a minimum of forty (40) hours of operation and maintenance instruction for a minimum of ten (10) building operators, with personal on-the-job instruction by factory-trained Engineers representing the manufacturers of the following equipment:
1. Variable frequency motor controllers.
  2. Instrumentation and control for HVAC.
- B. Provide a minimum of twenty (20) hours of operation and maintenance instruction for building operators, with personal on-the-job instruction by factory-trained Engineers representing the manufacturers of the following equipment:
1. Facility fuel systems.
  2. HVAC water treatment.
  3. Packaged compressor and condenser units.
  4. Packaged HVAC equipment.
  5. Custom-packaged HVAC equipment.
  6. Computer room type air conditioners.
- C. The instruction sessions shall be scheduled at time(s) convenient to the Owner's personnel. Instruction shall cover all equipment and systems including, but not limited to, all conditioned air, water and steam distribution systems provided under this section. Instruction shall be comprised of both classroom-type and actual hands-on operating experience.
- D. The Owner may videotape all instruction sessions for purposes of future training. Provide a review and written critique of Owner's videotape within one (1) month after completion of the instruction sessions and receipt of the Owner's videotapes. The critique shall correct all mistakes and clarify all outstanding questions that arise during the sessions.

END OF SECTION 23 01 00



SECTION 23 05 00

COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 Work Included

- A. The Construction Drawings and these specifications form a part of the Construction Documents.
- B. The work includes, but is not limited to, providing all materials, labor, equipment, tools, appliances, services, hoisting, scaffolding, support and supervision for the furnishing and installing of all the heating, ventilating and air conditioning work, and all related work complete, in accordance with the Construction Documents for the following systems, equipment and services:
  - 1. A system of chilled and hot water including, but not limited to, an air source heat pump plant. The units shall operate with R-410 refrigerant and shall include integral glycol hot and chilled water pumps with isolation valves, piping, valves, fittings, insulation, automatic controls, flow-measuring devices, expansion tanks, hangers, anchor guides and supports, vibration isolators and all necessary auxiliaries, etc.
  - 2. Water treatment systems for all water systems including, but not limited to, glycol chilled water, glycol hot water. This Contractor shall furnish and install all water treatment equipment as required by the Construction Documents.
  - 3. Water filtrations systems as indicated on the Contract Drawings.
  - 4. A system of unit heaters and/or fan coil-type heaters shall be provided at all entrances, exits, stairs, building overhangs, soffits and Mechanical Equipment Rooms, including all necessary piping, insulation, controls, valves and all required auxiliaries, etc.
  - 5. Systems of an air cooled energy recovery unit for the community center. The ERU shall provide supply and return for the Community Center.
  - 6. Technology Spaces and other 24/7 occupancy shall consist of air cooled split systems.
  - 7. System(s) of toilet exhaust, post-fire exhaust, garage exhaust, mechanical/back of house room exhaust, elevator hoistway venting, including all necessary fans, motors and motor controllers, VFD's, ductwork, grilles, registers, balancing dampers, gravity dampers, automatic dampers, automatic temperature controls, sound traps, smoke detectors (furnished, installed and wired under Division 28 - Life Safety of the Construction Documents), insulation, vibration isolation, acoustic treatment and all required auxiliaries, etc.
  - 8. A fixed permanent venting system for the Gas Meter Rooms consisting of a welded metal vent pipe connecting the room to atmosphere. Terminate the pipe at the Ground Level with a perforated vent plate in the building facade as indicated on the Architectural Drawings.
  - 9. Acoustic treatment systems for all air handling fans and systems including, but not limited to, sound traps, cone attenuators, acoustic insulation, double-wall acoustic treatment and all required auxiliaries, etc.
  - 10. Installation of all sensors, etc., in piping, ductwork, air conditioning systems, heating and ventilating systems, etc. furnished under Section 23 09 00 - Instrumentation and Control for HVAC, including piping thermometer wells, nipples, siphons, valves, etc., as required.
  - 11. Installation of all automatically controlled valves and airflow monitors, furnished under Section 23 09 00 - Instrumentation and Control for HVAC, or any other device, such as sensor wells and taps, specified in Section 23 09 00, which requires installation into systems included as work of this division of the Construction Documents.
  - 12. Furnishing, where applicable, and installation of all dampers (including automatic dampers, combination fire/smoke dampers and smoke dampers) with all associated actuator linkages, damper sleeves, etc., to provide complete damper installation. Refer to Section 23 09 00 - Instrumentation and Control for HVAC for further requirements.



13. Labor or standby for assistance in commissioning the control and instrumentation systems provided in Section 23 09 00 - Instrumentation and Control for HVAC of the Construction Documents.
14. Thermal and acoustical insulation.
15. Sound traps.
16. Fire dampers, smoke dampers and combination fire/smoke dampers.
17. Hangers, anchors, guides, supports and vibration isolation, including seismic restraints.
18. Furnish and set all sleeves, complete with seals and firestops as specified herein and as required by the Authority Having Jurisdiction for the passage of pipes and ducts through structural steel, decking, masonry and concrete walls and floors and elsewhere, as shall be required for the proper protection of each pipe and duct passing through a wall, floor, etc. Coordinate the work with the work of other trades in order to properly expedite and perform the work. Furnish shop drawings showing the size and location of all required holes through the concrete floors and walls.
19. As soon as practically possible, submit to the Construction Manager/General Contractor a list of all required water makeup and drain locations for equipment.
20. Pipe valved drain lines from all drains, air conditioning units, pumps, etc., to the nearest funnel or floor drain. Valves shall be located at hand-height where possible. Valved water outlets shall be provided in the various Machine Rooms under Division 22 - Plumbing of these Construction Documents and as indicated on the Plumbing Drawings. Make all final water connections to this equipment from these valved water outlets.
21. Patch or replace all fireproofing if it is damaged or removed during the installation of the heating, ventilating and air conditioning work.
22. Participate in and assist in the operation of the life safety ventilation equipment as required during the performance testing and startup of the Division 28 - Electronic Safety and Security systems. Refer to Division 26 - Electrical for additional requirements.
23. Participate in and assist in the operation of the life safety ventilation equipment as required during the performance testing and startup of the Division 28 - Electronic Safety and Security systems. Refer to Division 26 - Electrical for additional requirements.
24. Instruments as required for operating and testing the various systems shall be furnished and installed complete as specified herein.
25. Owner's personnel shall be fully instructed regarding operation and maintenance of the entire installation, and complete printed or typed instruction booklets shall be provided covering maintenance, operation and adjustment of each piece of equipment. Spare parts lists for each piece of equipment shall be furnished.
26. Smoke detector elements shall be furnished, installed and wired under Division 28 - Electronic Safety and Security of the specifications. This Contractor shall provide the required openings in ducts, plenums, sheet metal casings, etc., to accommodate the installation of the smoke detectors. The Division 28 Contractor shall obtain the necessary approvals therefor. Closely coordinate the installation requirements for all smoke detector elements with the work of Division 28 of the Construction Documents.
27. Furnish and deliver to the Construction Manager/General Contractor all access doors in finished construction.
28. Testing adjusting and balancing of all systems.
29. Complete flushing and chemical treatment and initial water treatment for all water systems.
30. Piping, duct, valve, damper and equipment identification systems.
31. Complete all tests required by all rules, regulations, etc., of all Authorities Having Jurisdiction as well as prepare, complete and file all forms, tabulations, plans, etc., pertinent thereto with the referenced authorities, and accomplish such work with personnel of proper caliber, in particular, Professional Engineers, where so required.
32. Participate in and provide all labor as required for off-hour testing of equipment and



systems, if required by job conditions or by Authorities Having Jurisdiction and as required to obtain Temporary Certificates of Occupancy (TCO's).

33. Participate in and provide all labor as required for "pull-the-plug" testing of the emergency power and emergency equipment and systems as scheduled and required by the Construction Manager/General Contractor to ensure proper system operation of fans and other miscellaneous equipment connected to the emergency power system. The required testing shall be at a time scheduled by the Construction Manager/General Contractor and may be off-hours.
34. All systems shall be commissioned by an independent Commissioning Authority in accordance with the requirements of the LEED rating system by the United States Green Building Council as specified in Section 23 08 00 - Commissioning of HVAC. This Contractor and/or his Subcontractors shall participate in and provide all labor as required for system commissioning, including any time required for a detailed review of the commissioning process as requested by the Engineer or the Owner.

#### 1.2 COMMISSIONING

- A. Provide all testing and commissioning as required. Obtain all commissioning requirements from the Commissioning Provider/Owner/Agent.

#### PART 2 - PRODUCTS

##### 2.1 GENERAL PRODUCT REQUIREMENTS

- A. Wind-Resistant Construction
  1. All equipment located outdoors (i.e., fans, air handlers, cooling towers, condensing units, ductwork, piping, etc.) shall be designed, constructed, installed and supported to resist wind loads of 100 mph (160 km/h).

#### PART 3 - EXECUTION

##### 3.1 NOT USED.

END OF SECTION 23 05 00



**Department of  
Design and  
Construction**

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Outline Specification

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SECTION 23 05 13

COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide all electric motors driving heating, ventilating and air conditioning equipment (i.e., fans, hydronic pumps, condensate pumps, fuel oil pumps, etc.) as indicated and scheduled on the drawings and in accordance with the Construction Documents.
- B. Section includes:
  - 1. Fractional horsepower motors.
  - 2. Open drip-proof integral horsepower motors (OPD).
  - 3. Totally enclosed fan-cooled integral horsepower motors (TEFC).
  - 4. Electronically commutated motors (ECM).

1.2 RELATED SECTIONS

- A. Refer to Divisions 01, 14, 21, 22, 26, 27 and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. Refer to Section 23 00 00.03 – Table of Contents for HVAC for specification sections that apply to all work herein.

1.3 REFERENCES

- A. Motors and their components shall be designed, manufactured and tested in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
  - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for New York City and New York State.
    - a. Building Code of the State of New York.
    - b. Fire Code of the State of New York.
    - c. Mechanical Code of the State of New York.
    - d. Energy Conservation Construction Code of New York State.
    - e. New York City Building Code.
    - f. New York City Energy Conservation Code
    - g. New York City Mechanical Code.
  - 2. Reference Standards: Perform all work in accordance with, but not limited to, the following standards:
    - a. American Bearing Manufacturing Association (ABMA)
      - 1). ABMA-4: Tolerance Definitions and Gauging Practices for Ball Bearings and Roller Bearings.
      - 2). ABMA-9: Load Ratings and Fatigue Life for Ball Bearings.
    - b. Institute of Electrical and Electronics Engineers (IEEE)
      - 1). IEEE Standard 112: Standard Test Procedures for Polyphase Induction Motors and Generators.
    - c. International Electrical Testing Association (NETA)
      - 1). NETA Standard for Acceptance Testing Specifications.
    - d. National Electrical Manufacturers Association (NEMA)
      - 1). NEMA MG-1: Motors and Generators.
    - e. Underwriters Laboratories, Inc. (UL)
      - 1). UL 674: Standard for Electric Motors and Generators for Use in Division 1 Hazardous (Classified) Locations.

1.4 SUBMITTALS

- A. Submittals shall be furnished in accordance with the requirements of Section 23 00 00 and shall include, but not be limited to, the following:



1. For each motor furnished, submit catalog data, including motor manufacturer, nameplate data, including horsepower, rpm, voltage, frequency, full-load amps, power factor and efficiency standards compliance, electrical ratings and characteristics, mechanical performance data, physical dimensions, weights and support points.
  2. Test Reports: Indicate procedures and results for specified factory and field testing.
  3. Manufacturer's Installation Instructions: Submit support details and connection requirements for pumping system.
- B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements. Drawings and data sheets shall be submitted for approval before the equipment is purchased.
- 1.5 WARRANTY
- A. Comply with Division 01 - General Requirements and Section 23 00 00 - General Requirements for HVAC for product warranties.
  - B. Furnish a three- (3-) year manufacturer's warranty for motors, associated accessories and components provided.
  - C. Warranty period shall initiate upon final acceptance by Owner.
- 1.6 COMMISSIONING
- A. Provide all testing and commissioning as required. Obtain all commissioning requirements from the Commissioning Provider/Owner/Agent.

## PART 2 - PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURERS

- A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical-characteristic requirements of the Construction Documents.
- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate, and must be accompanied by a Letter of Equivalency certifying the product's equivalency in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved, neither the project specifications nor the Construction Documents will be revised to reflect the substitution.
- C. Standard-Efficiency Motors (Less Than 1 HP)
  1. A. O. Smith.
  2. Baldor.
  3. General Electric.
  4. Leeson.
  5. Lincoln.
  6. Marathon.
  7. Reliance.
  8. Teco-Westinghouse.
  9. Toshiba.
  10. Weg.
- D. Premium-Efficiency Motors (1 HP and Above)
  1. A. O. Smith.
  2. Baldor.
  3. General Electric.
  4. Leeson.
  5. Marathon.
  6. Reliance.
  7. Teco-Westinghouse.



- 8. Toshiba.
- 9. Weg.

2.2 GENERAL REQUIREMENTS

- A. All motors shall be suitable for the use intended, i.e., with variable speed (variable frequency/voltage) drives cycled start/stop and/or constant speed as scheduled. Motors used in variable speed applications shall be designed to operate under variable torque load (or as specified) from maximum rated speed down to 10% of rated speed. Motors shall be designed to operate continuously at any point in the speed range. Any deviation from this requirement shall be noted and submitted with bid.
- B. Coordinate motor with the torque and inertia load of the equipment served, and the inrush characteristics of the motor with the starter selection, so that all items furnished constitute a properly related package. No motor shall operate in the service factor range.
- C. Motors shall be of sizes and types specified, of the proper power and speed to suit the specified makes of equipment. If other than the specified makes of equipment are accepted, the adjustment of motor horsepower, motor speed, wire size, motor disconnect and starter sizing must be included without additional cost.
- D. Match wiring connections with controllers. Starters for motors 1/2 hp to 75 hp shall be magnetic across-the-line type with combination fusible switches. For pump motors over 100 hp, starters shall be part-winding (1/2-1/2) type. All starters for fan motors 100 hp and over shall be reduced-voltage, autotransformer, closed-transition type.
- E. Motors 1 hp and larger shall be premium-efficiency, of sizes and types as specified, of the proper power and speed to suit the specified makes of equipment.
- F. Except as otherwise noted, all motors smaller than 1/2 horsepower (0.09 kcal/s) shall operate on 120 volt, single-phase, 60 hertz, alternating current.
- G. Equipment manufacturer's standard motors may be provided when motors are less than 250 watts (0.06 kcal/s) or 1/4 hp (0.045 kcal/s).
- H. Single-phase motors shall be of the permanent split-capacitor type, where available. Alternatively, split-phase start capacitor run or capacitor start/capacitor run motors may be used.
- I. All motors 1/2 horsepower and larger shall operate on electrical voltages and characteristics as scheduled.
- J. In general, except as otherwise specified, all horizontal motors for indoor operation in a clean environment shall be open drip-proof (ODP). Motors installed outdoors or located in hostile non-hazardous environments shall be weatherproofed totally enclosed fan-cooled (TEFC) with Inpro/Seals. All motors in hazardous locations shall be approved for the application and meet the class and group as required by the area classification. Motors shall be squirrel-cage induction type, guaranteed to fulfill the specified requirements without producing any sound audible outside of Machine Rooms.
  - 1. Motors shall be constructed in accordance with the following:
    - a. They shall be fitted with extra-heavy-duty grease-lubricated bearings having a minimum ABMA 9, L10 life of 200,000 hours (rated at continuous duty) and bearing housings fitted with self-sealing grease fittings and pressure-relief fittings.
    - b. Motors shall be of cast iron construction (aluminum is not acceptable). Conduit box shall be cast iron, diagonally split with threaded hole for conduit.
    - c. Each motor shall have a stainless steel or aluminum data plate containing the following minimum information:
 

Manufacturer	rpm	UL Label
Type	Voltage/Phase Frequency	Connection Diagram
Model	Enclosure Type	Motor Efficiency
Horsepower	Frame Size	Full-Load Current
Service Factor		
  - 2. In addition to the above requirements, constant speed motors rated for continuous duty shall be constructed in accordance with the following:
    - a. Insulation system shall be rated minimum NEMA Class B (130°C).



- b. Maximum temperature rise by resistance at rated hp shall not exceed Class B limits (80°C).
  - c. They shall operate within the 1.15 service factor, the maximum temperature rise by resistance shall not exceed Class F limits (90°C).
  - d. The speed/torque and speed/current characteristics shall comply with NEMA Design A or B, as specified.
  - e. Motors shall be suitable for full-voltage starting, unless otherwise specified.
  - f. Sound Power Levels: Conform to NEMA MG 1
3. Motors applied to variable frequency drives (VFD's) shall adhere to NEMA Standard Publication MG 1, Part 30, Application Considerations for Constant Speed Motors Used on a Sinusoidal Bus with Harmonic Content and General Purpose Motors Used with Adjustable-Voltage or Adjustable-Frequency Controls or Both, or Part 31, Definite-Purpose Inverter-Fed Polyphase Motors. They shall be constructed in accordance with the following:
- a. Insulation system shall be a minimum NEMA Class F (155°C) rating.
  - b. Maximum temperature rise by resistance at rated hp shall not exceed Class F limits (105°C).
  - c. They shall operate within the 1.15 service factor; the maximum temperature rise by resistance shall not exceed Class F limits (115°C)
  - d. Motors applied to VFD's shall be furnished with shaft grounding rings.
- K. Multi-speed motors having a 2-to-1 speed ratio shall be single-winding consequential-pole type.
- L. Multi-speed motors other than those with a 2-to-1 speed ratio shall have separate windings for each speed.
- M. All motors shall be sized to have sufficient starting torque to be able to accelerate the driven load from zero rpm to design speed rpm within six (6) seconds maximum. Submit substantiating calculations.
- N. Three-phase motors shall have the following nominal efficiencies when tested in accordance with IEEE Standard 112 Test Mounted Method B. The spread between the specified nominal efficiency and the minimum efficiency shall not exceed the values listed in Table 12-12 and 12-13 of NEMA Standard MG-1.

HP	kW	Nominal Efficiencies (%)			
		Open Drip-Proof		Totally Enclosed Fan-Cooled	
		1,750 rpm	3,600 rpm	1,750 rpm	3,600 rpm
1	0.75	85.5	77	85.5	77
1-1/2	1.1	86.5	84	86.5	84
2	1.5	86.5	85.5	86.5	85.5
3	2.2	89.5	85.5	89.5	86.5
5	3.7	89.5	86.5	89.5	88.5
7-1/2	5.5	91	88.5	91.7	89.5
10	7.5	91.7	89.5	91.7	90.2
15	11	93	90.2	92.4	91
20	15	93	91	93	91.7
25	19	93.6	91.7	93.6	91.7
30	22	94.1	91.7	93.6	92.4
40	30	94.1	92.4	94.1	93
50	37	94.5	93	94.5	93.6
60	45	95	93.6	95	93.6
75	55	95	93.6	95.4	94.1



HP	kW	Nominal Efficiencies (%)			
		Open Drip-Proof		Totally Enclosed Fan-Cooled	
		1,750 rpm	3,600 rpm	1,750 rpm	3,600 rpm
100	75	95.4	93.6	95.4	95
125	90	95.4	94.1	95.4	95
150	110	95.8	94.1	95.8	95.4
200	150	95.8	95	96.2	95.4
250	185	95.8	95	96.2	95.8
300	225	95.8	95.4	96.2	95.8
350	260	95.8	95.4	96.2	95.4

PART 3 - EXECUTION  
3.1 NOT APPLICABLE

END OF SECTION 23 05 13



**Department of  
Design and  
Construction**

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Outline Specification

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SECTION 23 05 14

COMMON MOTOR CONTROL REQUIREMENTS FOR HVAC EQUIPMENT

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Provide all motor controls and starters for motors driving heating, ventilating and air conditioning equipment (i.e., fans, hydronic pumps, condensate pumps, fuel oil pumps, etc.) as indicated and scheduled on the drawings and in accordance with the Construction Documents.
- B. Section includes:
  - 1. Motor Control Centers.
  - 2. Individual motor starters.
  - 3. Across-the-line starters.
  - 4. Reduced-voltage, autotransformer, closed-transition starters.

**1.2 REFERENCES**

- A. All Motor Control Centers and individual motor starters and the associated components shall be designed, manufactured and tested in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
  - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for New York City and New York State.
    - a. Building Code of the State of New York.
    - b. Energy Conservation Code of the State of New York
    - c. Fire Code of the State of New York.
    - d. Mechanical Code of the State of New York.
    - e. Energy Conservation Construction Code of New York State.
    - f. New York City Building Code.
    - g. New York City Energy Conservation Code
    - h. New York City Mechanical Code.
  - 2. Reference Standards: Perform all work in accordance with, but not limited to, the following standards:
    - a. American National Standards Institute (ANSI)
      - 1). ANSI - 63.12: Electromagnetic Compatibility Limits - Recommended Practices.
    - b. International Electrical Testing Association (NETA)
      - 1). NETA Standard for Acceptance Testing Specifications.
    - c. National Electrical Manufacturers Association (NEMA)
      - 1). NEMA 250: Enclosures for Electrical Equipment.
    - d. Underwriters Laboratories, Inc. (UL)
      - 1). UL 508: IEC Type 2 Coordination Short Circuit Tests of Electromechanical Motor Controllers in Accordance with IEC Publication 947-4-1.
      - 2). 60947-41A: Low-Voltage Switchgear and Controlgear - Part 4-1: Contactors and motor-starters - Electromechanical contactors and motor-starters.

**1.3 SUBMITTALS**

- A. Submittals shall be furnished in accordance with the requirements of Section 23 00 00 and shall include, but not be limited to, the following:
  - 1. For each motor starter and Motor Control Center furnished, submit catalog data including nameplate data, standards compliance, wiring diagrams, electrical ratings and characteristics, withstand ratings, physical dimensions, weights and support points.
- B. Drawings and data sheets shall be submitted for approval before the equipment is purchased.



1.4 WARRANTY

- A. Comply with Division 01 and Section 23 00 00 requirements for product warranties.
- B. Furnish a three (3) year manufacturer's warranty for all starters, associated accessories and components provided. If the base price includes a guarantee period of more than one (1) year but less than three (3) years, state the following:
  - 1. The period included in the base price.
  - 2. The additional cost for three (3) years.
- C. The warranty period shall initiate upon Final Acceptance by Owner.

1.5 COMMISSIONING

- A. Provide all testing and commissioning as required. Obtain all commissioning requirements from the Commissioning Provider/Owner/Agent.

**PART 2 - PRODUCTS**

2.1 ACCEPTABLE MANUFACTURERS

- A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical-characteristic requirements of the Construction Documents.
- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate, and must be accompanied by a Letter of Equivalency certifying the product's equivalency in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved, neither the project specifications nor the Construction Documents shall be revised to reflect the substitution.
- C. Individual Motor Starters
  - 1. Allen-Bradley.
  - 2. Cutler-Hammer.
  - 3. General Electric.
  - 4. Gould.
  - 5. Siemens.
  - 6. Square D.
  - 7. Westinghouse.
- D. Motor Control Centers
  - 1. Allen-Bradley.
  - 2. Cutler-Hammer.
  - 3. General Electric.
  - 4. Gould.
  - 5. Siemens.
  - 6. Square D.
  - 7. Westinghouse.

2.2 GENERAL REQUIREMENTS

- A. Furnish and turn over to the Construction Manager/General Contractor, who will coordinate the installation of same, suitable starting and controlling equipment, all as specified hereinafter and as shown on drawings. Starting equipment shall be arranged, generally, in Control Centers or, in certain cases, as isolated combination starters, as specified or indicated.
- B. Starters for motors less than 1/2 hp shall be 120 volt, single-phase, 60 hertz, AC service. Manual starters with overload protection and lockout-type disconnect switch or breaker may be used to control such motors, except where interlocks or automatic controls are required. In such cases, magnetic across-the-line starters shall be furnished.
- C. Starters for motors 1/2 hp to 75 hp shall be magnetic across-the-line type with combination fusible





switches. Such starters shall match the scheduled motor electrical characteristics for voltage, phase and frequency.

- D. Starters for pump motors over 100 hp shall be part-winding (1/2-1/2) type. All starters for fan motors 100 hp and over shall be reduced-voltage, autotransformer, closed-transition type. These starters shall match the scheduled motor electrical characteristics for voltage, phase and frequency, and they shall be combination lockout fusible-switch type.
- E. 208 volt starter assemblies shall be rated for 100,000 A.I.C.
- F. Controllers for condensate pumps, duplex air compressors, sump and ejector pumps, etc., shall be factory-mounted and wired as part of the work of this section and the Plumbing Section.
- G. Fusible switches in Control Centers shall be in accordance with the schedules on the Electrical Drawings.
- H. Magnetic starters subject to manual start and in direct view of the motors they control shall have momentary-contact start and stop buttons built into cover. All magnetic starters subject to electrical interlock or automatic control shall have "hand-off-automatic" switches built into cover. Selector switches in starters shall be of the maintain-contact type. Refer to Motor Control Center schedules on the Electrical Drawings.
- I. All starters higher than 120 volt service shall have a transformer built into each starter casing for 120 volts. Each control transformer shall be provided with fuse protection on both the primary and secondary sides of the transformer. Transformers shall serve all control circuits, including auxiliary devices. Each starter subject to electrical interlock and/or automatic control shall have the necessary auxiliary contacts. One (1) set of auxiliary contacts with terminals shall be provided for each control circuit. Control Centers shall be provided with control terminal blocks.
- J. Magnetic starters shall have ambient-compensated, manually resettable, thermal overload in each phase leg and low-voltage protection. Overload selection shall be based on actual full-load nameplate amps of motor installed.
- K. All components within starters (relays, coils, cores, resistance, insulation contacts, trippers, etc.) shall be of the approved type. All parts subject to wear, arcing, etc., shall be renewable.
- L. All wiring within starters shall be in full accordance with all local and underwriters code requirements.
- M. Furnish interposing relays where indicated on the Electrical Drawings, built into starters where possible. In all other cases, relays shall be furnished in separate enclosures or local control panels.

### 2.3 INDIVIDUAL MOTOR STARTERS

- A. Individual starters shall be fully enclosed in neatly finished ventilated boxes of code-gauge steel, machine formed and welded. These boxes shall be arranged for floor, wall or angle iron frame mounting, as shown on plans or as directed, and shall each have a door with a spring-catch handle. These controllers shall be of the combination starter-lockout fusible-switch type.
- B. Enclosures for individual starters shall be as follows:
  - 1. Within the building or within equipment control cabinets (NEMA 1).
  - 2. Within Fan Rooms used as return-air plenums (NEMA 12).
  - 3. Installed outdoors (NEMA 3R).
- C. Painting: All internal and external surfaces shall be thoroughly cleaned and, except as otherwise noted, all factory-manufactured and -assembled apparatus that is not galvanized shall be factory-coated with one (1) coat of primer and two (2) coats of machinery enamel at the factory. Provide one (1) can of touch-up paint of matching color per unit to repair any damage which may have occurred during installation.
- D. Permanent Identification: Phenolic tags shall be attached to all units with not less than 5/8-inch-high letters with the Owner's designated identifying number and nomenclature as directed and as shown on the drawings and schedules.



**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. The Electrical Trade will mount the Motor Control Centers on suitable concrete curbs and/or pads, furnished by others.
- B. Individual motor starters may be mounted on suitably reinforced and braced floor stands made of 12 gauge roll-formed 1-5/8 inch (40 mm) by 1-5/8 inch (40 mm) minimum structural steel channel, or they may be surface-mounted on walls with standoffs made of 12 gauge roll-formed 1-5/8 inch (40 mm) by 1-5/8 inch (40 mm) minimum structural steel channel.
- C. Individual motor starters shall not be mounted on fan casings, plenums, ducts, etc.

END OF SECTION 23 05 14



SECTION 23 05 15

VARIABLE FREQUENCY MOTOR CONTROLLERS FOR HVAC EQUIPMENT

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Provide all variable frequency motor controllers for motors driving heating, ventilating and air conditioning equipment (i.e., fans, hydronic pumps, condensate pumps, fuel oil pumps, etc.) as indicated and scheduled on the drawings and in accordance with the Construction Documents.
- B. Section includes:
  - 1. Variable frequency motor controllers.

**1.2 REFERENCES**

- A. All variable frequency motor controllers and associated components shall be designed, manufactured and tested in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
  - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for New York City and New York State.
    - a. Building Code of the State of New York.
    - b. Fire Code of the State of New York.
    - c. Mechanical Code of the State of New York.
    - d. Energy Conservation Construction Code of New York State.
    - e. New York City Building Code.
    - f. New York City Mechanical Code.
  - 2. Reference Standards: Perform all work in accordance with, but not limited to, the following standards:
    - a. American National Standards Institute (ANSI)
      - 1). ANSI - 63.12: Electromagnetic Compatibility Limits - Recommended Practices.
    - b. Institute of Electrical and Electronics Engineers (IEEE)
      - 1). IEEE Standard 519: Recommended Practices and Requirements for Harmonic Control in Electric Power Systems.
    - c. International Electrical Testing Association (NETA)
      - 1). NETA Standard for Acceptance Testing Specifications.
    - d. National Electrical Manufacturers Association (NEMA)
      - 1). NEMA 250: Enclosures for Electrical Equipment.
    - e. Underwriters Laboratories, Inc. (UL)
      - 1). UL 508: IEC Type "2" Coordination Short Circuit Tests of Electromechanical Motor Controllers in Accordance with IEC Publication 947-4-1.
      - 2). 60947-41A: Low-Voltage Switchgear and Controlgear - Part 4-1: Contactors and motor-starters - Electromechanical contactors and motor-starters.

**1.3 SUBMITTALS**

- A. Submittals shall be furnished in accordance with the requirements of Section 23 00 00 and shall include, but not be limited to, the following:
- B. A paragraph-by-paragraph specification Compliance Review with "C", "D" or "E" marked in the margin of the original specification and of any subsequent addenda. Unless a deviation or exception is specifically noted in the Compliance Review, it is assumed that the Bidder is in complete compliance with the plans and specifications. Deviations or exceptions taken in cover letters and subsidiary documents, by omission or by contradiction, do not release the Bidder from



being in complete compliance, unless the exception or deviation has been specifically noted (explicitly, not by implication) in the Compliance Review.

1. "C": Comply with no exceptions.
2. "D": Comply with deviations. For each and every deviation, provide a numbered footnote with reasons for the proposed deviation and how the intent of the specification can be satisfied.
3. "E": Exception; do not comply. For each and every exception, provide a numbered footnote with reasons and possible alternatives.

C. Drawings and data sheets shall be submitted for approval before the equipment is purchased.

1.4 **WARRANTY**

A. Comply with Division 01 - General Requirements and Section 23 00 00 requirements for product warranties.

B. Furnish a three- (3)-year manufacturer's warranty for motors, associated accessories and components provided. If the base price includes a guarantee period of more than one (1) year but less than three (3) years, state the following:

1. The period included in base price.
2. The additional cost for three (3) years.

C. The warranty period shall initiate upon Final Acceptance by Owner.

1.5 **COMMISSIONING**

A. Provide all testing and commissioning as required. Obtain all commissioning requirements from the Commissioning Provider/Owner/Agent.

**PART 2 - PRODUCTS**

2.1 **ACCEPTABLE MANUFACTURERS**

A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment which does not comply with the performance and/or physical-characteristic requirements of the Construction Documents.

B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate, and must be accompanied by a Letter of Equivalency certifying the product's equivalency in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved, neither the project specifications nor the Construction Documents shall be revised to reflect the substitution.

C. Variable Frequency Motor Controllers

1. Allen-Bradley.
2. Asea Brown Boveri.
3. Baldor/Reliance.
4. Eaton.
5. General Electric.
6. Hitachi.
7. Mitsubishi.
8. Nidec (formerly Emerson).
9. Schneider Electric.
10. Siemens Allis.
11. Toshiba.
12. Yaskawa Electric Corp.

2.2 **GENERAL REQUIREMENTS**

A. Furnish and turn over to the Construction Manager/General Contractor, who shall coordinate the installation of same, variable frequency motor controllers all as specified hereinafter and as shown



on the drawings.

2.3 VARIABLE FREQUENCY MOTOR CONTROLLERS

- A. Controllers shall be designed for following service conditions.
  - 1. Elevation: to 3,300 feet altitude without derating.
  - 2. Ambient Temperature: 0°C to 40°C.
  - 3. Relative Humidity: to 95% non-condensing.
  - 4. Input Voltage: As scheduled.
  - 5. Output Voltages: As scheduled.
  - 6. The VFD assembly shall be rated for 100,000 A.I.C.
- B. Variable speed motor drives shall consist of a fully digital (front-end) adjustable-frequency, variable-torque, AC motor controller performance-matched to a high-efficiency motor. The controller manufacturer shall assume responsibility for matching motor and adjustable-frequency controller characteristics to each other and to the requirements of the driven load. The controller must be able to safely vary the speed of the motor while allowing the motor to meet the requirements of the fan or pump speed torque curve as dictated by the system static and/or dynamic (head) requirements at the shaft of the motor. The selection of the controller/motor combination must result in an acoustically compatible performance without objectionable motor noise. Costs associated with field adjustment and/or modifications of the controller to eliminate objectionable motor noise shall be borne by the controller manufacturer.
- C. The input rating of the controllers shall not be greater than the output current rating.
- D. All controllers and associated auxiliaries shall be mounted within enclosures, suitable for floor, wall, rack, or Motor Control Center mounting without modification of the enclosure.
- E. Enclosures shall comply with the following:
  - 1. Within the building or within equipment control cabinets (NEMA 1).
  - 2. Within Fan Rooms used as return-air plenums (NEMA 12).
  - 3. Installed outdoors (NEMA 3R) with thermostatically controlled electric heaters.
  - 4. They shall be provided with cooling fans having a minimum life expectancy of 40,000 hours. The fans shall be thermostatically controlled and easily replaceable without removing the VFD.
- F. Power terminations shall consist of pressure-type copper feeder cable terminals (set-screw shall not be acceptable) for top or bottom entrance, with wireway space suitable to meet the applicable codes. All exit/entrance conditions must be coordinated with the plans and the Installing Contractor. Ground lugs shall be provided for incoming and outgoing ground connections. All internal power wiring, control wiring, bus bars and associated components shall be copper.
- G. Enclosure doors shall be secured with screws or key-locked with interlock provisions to prevent unauthorized opening of the door with the disconnect circuit breaker in the on position.
- H. The enclosure shall provide adequate conduit space and wireways and/or troughs in accordance with all applicable code requirements.
- I. The controller shall include, as a minimum, the following features and functions:
  - 1. AC incoming-line circuit breaker or fused disconnect with an interlocked, padlockable handle mechanism.
  - 2. The controller shall include a battery backup for user programmable setting protection having a 10-year life expectancy.
  - 3. Designed to withstand output terminal line-to-line and line-to-ground short circuits without component failure.
  - 4. Reverse-phase and single-phase loss protection for each phase on both the line (input) and load (output) sides of the VFD.
  - 5. Overfrequency protection.
  - 6. DC overvoltage protection.
  - 7. Surge protection from AC line transients.



8. Motor slip-dependent speed regulation, 3% maximum.
  9. Frequency stability  $\pm 0.5\%$  for 24 hours with voltage regulation of  $\pm 2\%$  of the maximum rated output voltage.
  10. Adjustable dwell time at start to optimize motor starting torque.
  11. Where control power transformers are required for 115 volt AC control power for operator devices, the control power shall be isolated from logic circuits. The transformers shall be fused on the primary and the secondary sides.
  12. Instantaneous overcurrent protection at 115% of the control's rated current.
  13. Adjustable current limit (50 - 110% of the controller's rated current).
  14. Selectable volts per hertz (V/Hz), linear or squared.
  15. Adjustable acceleration and deceleration times of 0 - 360 seconds for 0 - 60 Hz.
  16. Adjustable maximum speed 100 - 0%.
  17. Adjustable minimum speed 0 - 100%.
  18. Adjustable motor output voltage boost.
  19. Adjustable electronic motor overload protection from 60 - 100% of the control's rated current.
  20. Selectable inverter speed signal.
  21. Selectable automatic restart after a fault.
  22. External fault indicator of fire or smoke.
  23. Critical speed avoidance (adjustable).
  24. Low-frequency voltage boost.
  25. Stability from 0 - 100%.
  26. 97% minimum efficiency at rated load.
  27. Dynamic volts per hertz (i.e., energy or flux optimization).
- J. The controller shall be capable of operation without the motor connected.
- K. The controller shall have a power outage ride-through capability of five (5) cycles.
- L. The controller shall also have an auto-restart feature that allows the drive to return to the last operating mode after a power outage, including the transfers to and from standby generation systems when switched via a UL-listed automatic transfer switch of momentary open, delayed open or closed transition.

### PART 3 - EXECUTION

END OF SECTION 23 05 15



SECTION 23 05 19

METERS AND GAUGES FOR HVAC PIPING

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Provide and install pressure gauges, thermometers, test ports, water-flow measuring stations and water-flow meters as indicated herein and on the Construction Documents with supplementary items necessary for their proper installation and operation.
- B. Section includes:
  - 1. Pressure gauges.
  - 2. Thermometers.
  - 3. Test ports.
  - 4. Water-flow measuring stations.
  - 5. Water-flow meters.
  - 6. Steam-flow meters.

**1.2 RELATED SECTIONS**

- A. Refer to Divisions 01, 14, 21, 22, 26, 27 and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. Refer to Section 23 00 00.03 – Table of Contents for HVAC for specification sections that apply to all work herein.

**1.3 REFERENCES**

- A. Meters, gauges and their components shall be designed, manufactured and tested in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
  - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for New York City and New York State.
    - a. Building Code of the State of New York.
    - b. Fire Code of the State of New York.
    - c. Mechanical Code of the State of New York.
    - d. Energy Conservation Construction Code of New York State.
    - e. New York City Building Code.
    - f. New York City Mechanical Code.
  - 2. Reference Standards: Perform all work in accordance with, but not limited to, the following standards:
    - a. American Society of Mechanical Engineers (ASME)
      - 1). ASME B40.100: Pressure Gauges and Gauge Attachments.
    - b. International Organization for Standardization (ISO)
      - 1). ISO 4064: Measurement of Water Flow in Fully Charged Closed Conduits - Meters for Cold Potable Water and Hot Water.

**1.4 SUBMITTALS**

- A. Submittals shall be furnished in accordance with the requirements of Section 23 00 00 and shall include, but not be limited to, the following:
  - 1. Submit a schedule showing the following information for all required pressure gauges, thermometers, flow-measuring stations and water-flow meters.
- B. Product Data: Submit manufacturers' product data and current literature, including the following:
  - 1. Materials, construction and dimensions.
  - 2. Installation details.
  - 3. Other pertinent information.
  - 4. Manufacturer's installation instructions.



1.5 WARRANTY

- A. Comply with Division 01 - General Requirements and Section 23 00 00 requirements for product warranties.
- B. Furnish a two- (2-) year manufacturer's warranty for all pressure gauges, thermometers, test ports, water-flow measuring stations, water-flow meters and steam-flow meters.
- C. Warranty period shall initiate upon Final Acceptance by Owner.

1.6 COMMISSIONING

- A. Provide all testing and commissioning as required. Obtain all commissioning requirements from the Commissioning Provider/Owner/Agent.

**PART 2 - PRODUCTS**

2.1 ACCEPTABLE MANUFACTURERS

- A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical-characteristic requirements as set forth in the Construction Documents.
- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate, and must be accompanied by a Letter of Equivalency certifying that the products are equivalent in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved, neither the project specifications nor the Construction Documents will be revised to reflect the substitution.
- C. Clamp-On Water-Flow Meters
  - 1. Dynasonics.
  - 2. Flexim.
  - 3. Sitrans.
- D. Differential Pressure Gauges
  - 1. Ashcroft.
  - 2. Mid-West Instrument.
  - 3. Weksler.
- E. Insertion-Type Water-Flow Meters
  - 1. EMCO Flow Systems.
  - 2. Onicon Incorporated.
  - 3. Data Industrial.
- F. Pressure Gauges
  - 1. Ashcroft.
  - 2. Barksdale.
  - 3. Manning, Maxwell & Moore.
  - 4. Marshall Town.
  - 5. Miljoco.
  - 6. Taylor.
  - 7. H. O. Trerice Co.
  - 8. Weiss.
  - 9. Weksler.
- G. Thermometers
  - 1. Ashcroft (Dial-Type).





2. Dynalco (Dial-Type).
  3. H. O. Trerice Co.
  4. Marsh Instruments (Marsh Bellofram).
  5. Miljoco.
  6. Weiss.
  7. Weksler.
- H. Water-Flow Measuring Stations

1. Balance Master.
2. Barco (Venturi meters).
3. Dieterich Standard.
4. Ellison Instrument.
5. Michigan.
6. New Buffalo.
7. Onicon.
8. Presso.
9. Mid-West Instrument.

## 2.2 PRESSURE GAUGES (INCLUDING DIFFERENTIAL PRESSURE GAUGES)

- A. All pressure gauges shall have 1% accuracy with ranges suitable for the service intended. The normal operating range shall be between 25% and 75% of the full-scale range, and the maximum operating pressure shall not exceed 75% of the full-scale range.
- B. Pressure gauges for oil and water systems shall be phosphor bronze Bourdon type, with 1/4 inch (6 mm) NPT bottom outlet, 4-1/2 inch (114 mm) dials, adjustable pointers, aluminum cases with rubber blow-out discs in rear and acrylic lenses. Gauges shall be fitted with pulsation snubbers and brass bar stock needle valves or ball valves rated at 600 psi (40 bar) WOG (ball cocks with plug-type mechanisms are not acceptable).
- C. Pressure gauges on steam services shall be stainless steel Bourdon type, with 1/4 inch (6 mm) NPT bottom outlet, 4-1/2 inch (114 mm) dials, adjustable pointers, aluminum cases with rubber blow-out discs in rear and acrylic lenses. Gauges shall be fitted with brass needle valves rated at 2,000 psi (138 bar) and a steel siphon (pigtail) to form a water barrier to prevent steam damage to the internals.
- D. Shop drawings shall be provided showing the locations and mounting arrangement of all pressure gauges as specified in Section 01 33 23 - Shop Drawings, Product Data and Samples.

## 2.3 THERMOMETERS

- A. Pipe thermometers shall be stem-type with cast-glass/mineral-reinforced polyester cases with environmentally safe organic spirit-fill, red or blue reading, 9 inch (230 mm) scale, having a separable socket and be field-adjustable in all planes to permit a convenient viewing angle.
- B. Thermometers for outdoor use shall be 3 inch (75 mm) bimetal dial-type having a 4 inch rear connection stem and separable 4 inch brass socket well with waterproof stainless steel casing and components. Lens shall be double-strength glass.
- C. Scale range shall be 0°F (-18°C) to 120°F (49°C) with 1° divisions for cold water systems and 30°F (1°C) to 240°F (115°C) with 2° divisions for hot water systems.

## 2.4 WATER-FLOW MEASURING STATIONS

- A. Annular primary flow elements shall be made of Type 316 stainless steel and rated to 400 psig (27.5 bar). Annular elements shall be complete with a permanent rustproof metal identification tag on a chain showing designed flow rates, meter readings or differential pressure outputs of designed flow rates, metered fluid, line size and tag, station or location number. Station sizes 1/2 inch (13 mm) to 1-1/4 inches (32 mm) shall be nipple section-type; sizes 2 inches (50 mm) and 2-1/2 inches (65 mm) shall be either nipple section or weld insert-type; and sizes 3 inches (75 mm) and larger shall be weld insert-type. Permanent pressure loss to the system shall not exceed 8.2% of the output differential on sizes over 1-1/2 inches (38 mm) and 2.9% on sizes over 5 inches



(125 mm). Accuracy of the flow-measuring elements shall be plus or minus 0.55 to plus or minus 1.5% as verified by independent laboratory reports. Repeatability shall be plus or minus 0.1% of rate.

**2.5 INSERTION TYPE WATER-FLOW METERS**

- A. Clamp-on ultrasonic flow meters shall be designed to mount on the exterior of the pipe. Meter flow range shall be - 40 to + 40 ft./s. (- 12 to + 12 m/s) for liquid. A DC-powered three-wire flow transmitter shall be flow-meter-mounted. Flow transmitter output shall be 4 - 20 mA DC linear with flow. The manufacturer's certificate of calibration shall be provided with each flow meter. Accuracy shall be within  $\pm 0.5\%$  to 1% at 1 ft./s. (0.3 m/s) of rate at the calibrated velocity, within  $\pm 1\%$  of rate over a 10:1 turndown 3.0 to 30 ft./s (0.9 to 9 m/s) and within  $\pm 2\%$  of rate over a 50:1 turndown from 0.4 to 20 ft./s (0.12 to 6 m/s).

**PART 3 - EXECUTION**

- A. Water-flow measuring stations prior to installation verify that the proper clearances are maintained upstream and down. Flow-measuring stations shall be provided and installed in the locations as indicated on the Construction Documents and in the following locations:
1. Chilled water supply from each refrigeration machine.
  2. Chilled water return branch from each side of chilled water coil banks or single coil banks.
  3. Heat recovery return branch from each side of heat recovery coil banks or single coil banks.
  4. Discharge of hot water heating system pump station discharge header.
  5. At additional locations as indicated on the Construction Documents.

END OF SECTION 23 05 19



SECTION 23 05 23

GENERAL-DUTY VALVES FOR HVAC PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide all hand valves, check valves, cocks, etc., as indicated and scheduled on the drawings and in accordance with the Construction Documents.
- B. Section includes:
  - 1. Balancing valves (ball type).
  - 2. Balancing valves (globe type).
  - 3. Balancing valves (plug type).
  - 4. Ball valves.
  - 5. High-performance butterfly valves.
  - 6. Check valves balanced (center-guided) type.
  - 7. Check valves swing type.
  - 8. Gate valves.
  - 9. Globe valves.
  - 10. Non-lubricated plug valves.
  - 11. Firesafe fusible link safety shutoff valves.
  - 12. Solenoid valves.
  - 13. Valve operators.

1.2 RELATED SECTIONS

- A. Refer to Divisions 01, 14, 21, 22, 26, 27 and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. Refer to Section 23 00 00.03 – Table of Contents for HVAC for specification sections that apply to all work herein.

1.3 REFERENCES

- A. All valves and associated components shall be designed, manufactured and tested in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
  - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for New York City and New York State.
    - a. Building Code of the State of New York.
    - b. Fire Code of the State of New York.
    - c. Mechanical Code of the State of New York.
    - d. Energy Conservation Construction Code of New York State.
    - e. New York City Building Code.
    - f. New York City Mechanical Code.
  - 2. Reference Standards: Perform all work in accordance with, but not limited to, the following standards:
    - a. American Petroleum Institute (API)
      - 1). API 607: Fire Test for Soft-Seated Quarter Turn Valves.
      - 2). API 608: Metal Ball Valves - Flanged and Welding Ends.
      - 3). API 609: Butterfly Valves: Double-Flanged, Lug and Wafer Type.
    - b. American Society of Mechanical Engineers (ASME)
      - 1). ASME/ANSI B16.5: Pipe Flanges and Fittings.
      - 2). ASME B16.34: Valves - Flanged Threaded and Welding End.
    - c. Manufacturers Standardization Society (MSS)
      - 1). MSS SP-6: Standard Finishes for Contact Faces of Pipe Flanges and Connecting-End Flanges of Valves and Fittings.
      - 2). MSS- SP-25: Standard Marking System for Valves, Fittings, Flanges and



- Unions.
- 3). MSS SP-53: Quality Standard for Steel Castings and Forgings for Valves, Flanges and Fittings and Other Piping Components.
  - 4). MSS SP-61: Pressure Testing Steel of Valves.
  - 5). MSS SP-67: Butterfly Valves.
  - 6). MSS SP-68: High-Pressure Offset Seat Butterfly Valves.
  - 7). MSS SP-70: Cast Iron Gate Valves, Flanged and Threaded Ends.
  - 8). MSS SP-71: Cast Iron Swing Check Valves, Flanged and Threaded Ends.
  - 9). MSS SP-72: Ball Valves with Flanged or Butt-Welding Ends for General Service.
  - 10). MSS SP-78: Cast Iron Plug Valves, Flanged and Threaded Ends.
  - 11). MSS SP-80: Bronze Gate, Globe, Angle and Check Valves.
  - 12). MSS SP-82: Valve Pressure Testing Methods.
  - 13). MSS SP-85: Cast Iron Globe and Angle Valves, Flanged and Threaded Ends.
  - 14). MSS SP-110: Ball Valves - Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

#### 1.4 SUBMITTALS

- A. Submittals shall be furnished in accordance with the requirements of Section 23 00 00 and shall include, but not be limited to, the following:
  1. Product Data: Submit manufacturers' product data, and current literature.

#### 1.5 WARRANTY

- A. Comply with Division 01 - General Requirements and Section 23 00 00 requirements for product warranties.
- B. Furnish five (5) year manufacturer's warranty for all valves.
- C. Warranty period shall initiate upon Final Acceptance by Owner.

#### 1.6 COMMISSIONING

- A. Provide all testing and commissioning as required. Obtain all commissioning requirements from the Commissioning Provider/Owner/Agent.

### PART 2 - PRODUCTS

#### 2.1 ACCEPTABLE MANUFACTURERS

- A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical-characteristic requirements of the Construction Documents.
- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate, and must be accompanied by a Letter of Equivalency certifying the product's equivalency in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved, neither the project specifications nor the Construction Documents will be revised to reflect the substitution.
- C. Balancing Valves - Ball Type
  1. Autoflow.
  2. Griswold.
  3. Hydronic Components Inc.
  4. IMI/Flow Design.
  5. Nexus.
  6. NIBCO.
- D. Balancing Valves - Globe Type (Class 125)
  1. Armstrong.



2. Autoflow.
3. Grinnell.
4. Macon Balancing NMA.
5. Nexus.
6. NIBCO.
7. Tour & Andersson (TA) through Victaulic.
- E. Balancing Valves - Plug Type (Class 125)
  1. Clow Valve.
  2. DeZurik.
  3. Flowserve-Nordstrom.
  4. Milliken.
  5. Val-Matic.
  6. Walworth.
- F. Balancing Valves - Automatic Flow Limiting Type
  1. Hays Fluid Control.
  2. Victaulic Series 76.
- G. Ball Valves (2 inches and smaller)
  1. Apollo.
  2. Crane.
  3. Flowserve/Worcester Controls.
  4. FlowTek.
  5. Hammond.
  6. Jamesbury.
  7. Jenkins.
  8. Milwaukee.
  9. NIBCO.
  10. Sharpe.
  11. Stockham.
  12. Watts.
- H. Ball Valves (to 12 inches)
  1. Flowserve/Worcester Controls.
  2. FlowTek.
  3. Milwaukee.
  4. NIBCO.
  5. Sharpe.
- I. Butterfly Valves (High-Performance)
  1. ABZ.
  2. Apollo.
  3. Bray.
  4. DeZurik.
  5. Flow Seal.
  6. Grinnell.
  7. Hammond.
  8. Jamesbury.
  9. Keystone.
  10. Milwaukee.
  11. Newco.
  12. NIBCO.
  13. Posi-Seal/Fisher.
  14. W.K.M.
- J. Butterfly Valves (Soft Seated)



- K. Check Valves Balanced (Center-Guided) Type
  - 1. DFT Inc.
  - 2. Flomatic Corporation.
  - 3. Keckley Company.
  - 4. Mueller Steam Specialty.
  - 5. Titan Flow Control, Inc.
  - 6. Val-Matic Valve & Manufacturing Corp.
- L. Check Valves Swing Type
  - 1. Crane.
  - 2. Hammond (I.B. Series only).
  - 3. Milwaukee.
  - 4. Newco.
  - 5. NIBCO.
  - 6. Powell.
  - 7. Walworth.
- M. Gate Valves
  - 1. Crane.
  - 2. Hammond (I.B. Series only).
  - 3. Milwaukee.
  - 4. Newco.
  - 5. NIBCO.
  - 6. Powell.
  - 7. Stockham.
  - 8. Walworth.
- N. Globe Valves
  - 1. Crane.
  - 2. Hammond.
  - 3. Milwaukee.
  - 4. Newco.
  - 5. NIBCO.
  - 6. Powell.
  - 7. Stockham.
  - 8. Walworth.
- O. Plug Valves (Non-Lubricated)
  - 1. DeZurik.
  - 2. Homestead Valve Co.
  - 3. Milliken.
- P. Firesafe Fusible Link Safety Shutoff Valves
  - 1. Bitorg (high-pressure applications only).
  - 2. Leslie Controls, Inc.
  - 3. Morrison Brothers.
  - 4. OPW.
  - 5. Preferred Utilities.
  - 6. William E. Williams Valve Corp.
- Q. Solenoid Valves
  - 1. ASCO.
  - 2. Magnatrol.
  - 3. Skinner.
- R. Steam Shutoff Valves
  - 1. Cameron - Orbit.
  - 2. Flow-Tek.



- 3. Vanessa Triple Offset.
- S. Motorized Valve Operators
  - 1. EIM Controls.
  - 2. Limitorque.
  - 3. Keystone EPI Series.
  - 4. Promation.
- T. Chainwheels
  - 1. Babbitt Steam Specialty Co.
  - 2. RotoHammer Industries.
  - 3. Trumbull Industries.

## 2.2 GENERAL REQUIREMENTS

- A. Shutoff valves, isolation valves, balancing valves and check valves shall be provided as shown on the drawings, required or directed. The standard features required of valves are listed hereinbelow.
- B. All valves shall meet the pressure and temperature requirements of the systems served. Refer to Section 23 21 13 of the specifications for the schedule of system operating temperatures and working pressures.
- C. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
- D. The use of butterfly valves shall be limited to shutoff services only and only where specifically permitted by these specifications. Butterfly valves will not be permitted in those services that require balancing or throttling valves.
- E. All end connections shall be the same as are used for fittings for 2 inches (50 mm) and below. 2-1/2 inches (65 mm) and above, valves shall be flanged.
- F. Valve End Connections
  - 1. Flanges on iron valves shall meet ASME B16.1.
  - 2. Flanges on steel valves shall meet ASME B16.5.
  - 3. Flanges on bronze and/or brass valves shall meet ASME B16.24.
  - 4. Threaded ends shall meet ASME B1.20.1.
  - 5. Soldered lines double-union ends with solder joints ASME B16.18.
- G. All steam service valves 6 inches and larger shall be furnished with a 1 inch bypass valve installed around the valve. Bypass valves shall have the same pressure-temperature ratings as the main valve.
- H. Valve Operators
  - 1. Provide gear operators on quarter-turn valves 5 inches (125 mm) and larger.
  - 2. Provide lever handles on quarter-turn valves (except plug valves) 4 inches (100 mm) and smaller.
  - 3. Handwheels shall be provided on valves other than quarter-turn types.
  - 4. Chainwheels shall be provided for attachment to valve handwheels, stems or other operators on all valves installed more than 6 feet 6 inches (2 m) above floors and/or working platforms.
- I. Valves in insulated piping shall be provided with 2 inch (50 mm) stem extensions having the following features:
  - 1. Extended operating handle of non-thermal-conductive material.
  - 2. Extended differential measuring ports.
  - 3. Protective sleeve that allows operation of valve and access to the measuring ports without breaking the vapor seal or disturbing insulation.
  - 4. Memory stops that are fully adjustable after insulation is applied.



**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Install shutoff valves, isolation valves and/or balancing valves at connections to each piece of equipment, arranged and installed with unions or flanges to allow service, maintenance and equipment removal without system shutdown.
- B. Plug valves shall be installed on the discharge of all constant-speed pumps.
- C. High-performance butterfly valves shall be provided on the discharge of all variable-speed pumps.
- D. The use of butterfly valves is limited to shutoff services only and only where permitted by the Construction Documents. Butterfly valves shall not be permitted in those services that require balancing or throttling.
- E. Locate valves for easy access and provide separate support where necessary.
- F. All butterfly valves shall be installed with a minimum of 6 straight pipe diameters between the valve and other piping elements.
- G. Install valves in horizontal piping with stem at or above center of pipe in a position that allows full stem movement. Butterfly valves may be installed with the stem horizontal to allow support for the disc and the cleaning action of the disc.
- H. All water piping connections to equipment shall include all necessary isolation valves, air vent valves, drain connections, balancing valves and the automatic valves arranged as detailed on the drawings.
- I. Valves in Pump Rooms, Equipment Rooms or Fan Rooms that are more than 6 feet 6 inches (2 m) above the floor shall be provided with chain-operated sheaves and chains.
- J. Install check valves for proper direction of flow and as follows:
  - 1. Swing Check Valves: In horizontal position with hinge pin level.
  - 2. Balanced Check Valves (Center-Guided): In horizontal or vertical position, with stem upright and plumb.

**3.2 CLEANING AND PROTECTION**

- A. Comply with Division 01 requirements for cleaning and protection of installed work.
- B. Comply with the requirements of Section 23 25 00 - HVAC Water Treatment for cleaning and protection of installed work.
- C. Upon completion of the installation, remove all protective materials.

**3.3 INSPECTION AND STARTUP**

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length and material. Verify that the gasket is of proper size, that material composition is suitable for service and that it is free from defects and damage.
- E. Defective valves shall be replaced with new valves.

**3.4 ADJUSTING**

- A. Adjust or replace valve packing after piping systems have been tested and put into service, but before final adjusting and balancing. Replace valves if persistent leaking occurs.
- B. Adjust valve stops to ensure positive shutoff.

END OF SECTION 23 05 23





SECTION 23 05 24

RELIEF VALVES FOR HVAC SYSTEMS AND EQUIPMENT

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Perform all work necessary to provide relief valves for all systems as indicated herein and on the Construction Documents, with supplementary items necessary for their proper installation and operation.
- B. Section includes:
  - 1. Pressure-relief valves.

**1.2 RELATED SECTIONS**

- A. Refer to Divisions 01, 14, 21, 22, 26, 27 and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. Refer to Section 23 00 00.03 – Table of Contents for HVAC for specification sections that apply to all work herein.

**1.3 REFERENCES**

- A. All relief valves shall be designed, manufactured and tested in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
  - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for New York City and New York State.
    - a. Building Code of the State of New York.
    - b. Fire Code of the State of New York.
    - c. Mechanical Code of the State of New York.
    - d. Energy Conservation Construction Code of New York State.
    - e. New York City Building Code.
    - f. New York City Mechanical Code.
  - 2. Reference Standards: Perform all work in accordance with, but not limited to, the following standards:
    - a. American Petroleum Institute (API)
      - 1). API 520: Sizing, Selection and Installation of Pressure-Relieving Devices in Refineries.
      - 2). API 526: Flanged Steel Pressure-Relief Valve.
      - 3). API 527: Seat Tightness of Pressure-Relief Valves.
    - b. American Society of Mechanical Engineers (ASME)
      - 1). ASME/ANSI B16.5: Pipe Flanges and Fittings.
      - 2). ASME B16.34: Valves Flanged Threaded and Welding End.
      - 3). ASME PTC 25: Pressure-Relief Devices.
    - c. ASTM International (ASTM)
      - 1). ASTM F 1508: Standard Specification for Angle Style, Pressure-Relief Valves for Steam, Gas and Liquid Services.
    - d. Manufacturers Standardization Society (MSS)
      - 1). MSS-SP-25: Standard Marking System for Valves, Fittings, Flanges and Unions.
      - 2). MSS SP-55: Quality Standard for Steel Castings for Valves, Flanges and Fittings and Other Piping Components.

**1.4 SUBMITTALS**

- A. Submittals shall be furnished in accordance with the requirements of Section 23 00 00.

**1.5 WARRANTY**

- A. Comply with Division 01 - General Requirements and Section 23 00 00 requirements for product



warranties.

- B. Furnish five- (5-) year manufacturer's warranty for all relief valves.
- C. Warranty period shall initiate upon Final Acceptance by Owner.

1.6 COMMISSIONING

- A. Provide all testing and commissioning as required. Obtain all commissioning requirements from the Commissioning Provider/Owner/Agent.

**PART 2 - PRODUCTS**

2.1 ACCEPTABLE MANUFACTURERS

- A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical-characteristic requirements of the Construction Documents.
- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate, and must be accompanied by a Letter of Equivalency certifying the product's equivalency in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved, neither the project specifications nor the Construction Documents will be revised to reflect the substitution.
- C. Relief Valves
  - 1. Anderson Greenwood.
  - 2. Apollo.
  - 3. Crosby.
  - 4. Dresser-Consolidated.
  - 5. Farris.
  - 6. Fulflo Specialties Co.
  - 7. Kunkle.
  - 8. Lunkenheimer.
  - 9. Watts.

2.2 GENERAL REQUIREMENTS

- A. Pressure-relief valves shall be provided as shown on the drawings, required or directed. The standard features required are listed hereinbelow.
- B. Valves at steam pressure-reducing stations shall be sized to carry 100% of scheduled capacity of the largest valve.
- C. Valve Pressure Settings, Working Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- D. Pressure settings on valves for fuel oil systems shall be no greater than 5 psi above the pressure required at the inlet to the equipment being served.
- E. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
- F. All end connections shall be the same as are used for fittings for 2 inches (50 mm) and below. 2-1/2 inches (65 mm) and above, valves shall be flanged.
- G. Valve End Connections
  - 1. Flanges on iron valves shall meet ASME B16.1.
  - 2. Flanges on steel valves shall meet ASME B16.5.
  - 3. Flanges on bronze and/or brass valves shall meet ASME B16.24.
  - 4. Threaded ends shall meet ASME B1.20.1.

**PART 3 - EXECUTION**

3.1 INSTALLATION

- A. Install pressure-relief valves as required by code, where shown on the drawings and/or in the



following locations:

1. Expansion tanks.
  - B. Relief piping shall be sized according to outlet size of relief valve.
  - C. The pressure drop between the protected vessel and/or pipe shall not be greater than 3% of the set pressure.
  - D. Elbows on the discharge of pressure-relief valves shall be supported to withstand reaction forces and the weight of the piping.
  - E. Where multiple relief valves in the same service are joined to a common header, the size of the header must be equal to or greater than the combined area of the discharge of all relief valves for the entire length to the point of relief.
  - F. Furnish and install drip-pan elbows on the discharge of all steam pressure-relief valves.
- 3.2 ADJUSTING
- A. Where required, adjust pressure setting as necessary prior to being put into service.
  - B. Adjust valve stops to ensure positive shutoff.

END OF SECTION 23 05 24



**Department of  
Design and  
Construction**

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Outline Specification

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SECTION 23 05 25

STRAINERS FOR HVAC SYSTEMS

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Provide and install strainers as indicated herein and on the Contract Documents with supplementary items necessary for their proper installation and operation.
- B. Section includes:
  - 1. Y-pattern steam strainers.
  - 2. Y-pattern water strainers.
  - 3. Simplex and duplex canister strainers.

**1.2 RELATED SECTIONS**

- A. Refer to Divisions 01, 14, 21, 22, 26, 27 and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. Refer to Section 23 00 00.03 – Table of Contents for HVAC for specification sections that apply to all work herein.

**1.3 REFERENCES**

- A. Strainers and their components shall be designed, manufactured and tested in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
  - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for New York City and New York State.
    - a. Building Code of the State of New York.
    - b. Fire Code of the State of New York.
    - c. Mechanical Code of the State of New York.
    - d. Energy Conservation Construction Code of New York State.
    - e. New York City Building Code.
    - f. New York City Mechanical Code.
  - 2. Reference Standards: Perform all work in accordance with, but not limited to, the following standards:
    - a. Manufacturers Standardization Society (MSS)
      - 1). MSS SP6 Standard Finishes for Contact Faces of Pipe Flanges and Connecting-End Flanges of Valves and Fittings.

**1.4 SUBMITTALS**

- A. Submittals shall be furnished in accordance with the requirements of Section 23 00 00.

**1.5 WARRANTY**

- A. Comply with Division 01 and Section 23 00 00 requirements for product warranties.
- B. Furnish a two- (2-) year manufacturer's warranty for all strainers.
- C. Warranty period shall initiate upon Final Acceptance by Owner.

**1.6 COMMISSIONING**

- A. Provide all testing and commissioning as required. Obtain all commissioning requirements from the Commissioning Provider/Owner/Agent.

**PART 2 - PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURERS**

- A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical-characteristic requirements as set forth in the Contract Documents.
- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate, and must be accompanied by a Letter of Equivalency certifying that the products are equivalent in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be



inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved, neither the project specifications nor the Contract Documents will be revised to reflect the substitution.

- C. Y-Pattern Strainers
  - 1. Fabrotech.
  - 2. Hoffman.
  - 3. Keckley.
  - 4. McAlear Mfg. Co.
  - 5. Metraflex.
  - 6. Mueller.
  - 7. Sarco.
  - 8. Titan.

2.2 Y-PATTERN STRAINERS

- A. Strainers shall have cast iron or bronze bodies of ample strength for the pressure to which they shall be subjected. They shall be of such a design as to allow blowing out of accumulated dirt, and to facilitate removal and replacement of a strainer screen, without disconnection of the main piping.
- B. All end connections shall be the same as are used for fittings for 2 inches (50 mm) and below. End connections for 2-1/2 inches (65 mm) and above shall be flanged.
- C. Strainer basket screens shall be stainless steel or brass and shall be of ample strength to prevent collapsing the basket under shock loading.
- D. Perforations shall be in accordance with the following table:

System or Service	Perforation Size	Free Area
Air	0.020 inch (0.50 mm)	30%
Water to 4 inches (100 mm)	0.0625 inch (1.6 mm)	41%
Water 5 inches (125 mm) and over	0.125 inch (3.17 mm)	40%

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Strainers in water lines shall be Y-pattern set in a horizontal (or vertical downward) run of the pipe. Where this is not feasible, strainers may be of enlarged cross-section basket type. In all cases, strainers shall be so arranged as not to "trap" pipes, and to facilitate disconnection and opening-up for cleaning.
- B. All strainers installed upstream of automatic control valves shall be the size of the inlet pipe shown on the drawings, *not* the reduced size serving the control valve.
- C. Furnish and install simplex basket strainers at the inlet to fuel oil pump sets and where indicated on the plans.
- D. Defective strainers shall be replaced with new.

END OF SECTION 23 05 25



SECTION 23 05 29

HANGERS AND SUPPORTS FOR HVAC PIPING, DUCTS AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide all hangers and supports for HVAC piping, ducts and equipment as indicated and scheduled on the drawings and in accordance with the Construction Documents.
- B. Section includes:
  - 1. Pipe hangers and supports.
  - 2. Pipe guides.
  - 3. Hanger rods.
  - 4. Insulated pipe shields.
  - 5. Cable supports for ducts.
  - 6. Structural steel attachments.
  - 7. Inserts.
  - 8. Post-installation mechanical anchors.
  - 9. Formed steel channel supports.
  - 10. Equipment bases and supports.
  - 11. Flashing.
  - 12. Equipment curbs.
  - 13. Sleeves.
  - 14. Mechanical sleeve seals.
  - 15. Firestopping relating to HVAC work.
  - 16. Firestopping accessories.

1.2 RELATED SECTIONS

- A. Refer to Divisions 01, 14, 21, 22, 26, 27 and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. Refer to Section 23 00 00.03 – Table of Contents for HVAC for specification sections that apply to all work herein.

1.3 REFERENCES

- A. Hangers, anchors, supports and their components shall be designed, manufactured and tested in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
  - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for New York City and New York State.
    - a. Building Code of the State of New York.
    - b. Fire Code of the State of New York.
    - c. Mechanical Code of the State of New York.
    - d. Energy Conservation Construction Code of New York State.
    - e. New York City Building Code.
    - f. New York City Mechanical Code.
  - 2. Reference Standards: Perform work in accordance with, but not limited to, the following standards:
    - a. American Concrete Institute (ACI)
      - 1). ACI 318: Building Code Requirements for Structural Concrete.
      - 2). ACI 355.2: Qualifications of Post-Installed Mechanical Anchors in Concrete & Commentary.
    - b. American Society of Mechanical Engineers
      - 1). ASME B31.1: Power Piping.



- 2). ASME B31.5: Refrigeration Piping.
- 3). ASME B31.9: Building Services Piping.
- c. ASTM International
  - 1). ASTM A36: Standard Specification for Carbon Structural Steel.
  - 2). ASTM A47: Standard Specification for Ferritic Malleable Iron Castings.
  - 3). ASTM A48: Standard Specification for Gray Iron Castings.
  - 4). ASTM A123: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - 5). ASTM A240: Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
  - 6). ASTM A283: Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
  - 7). ASTM A536: Standard Specification for Ductile Iron Castings.
  - 8). ASTM A575: Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades.
  - 9). ASTM A668: Standard Specification for Steel Forgings, Carbon and Alloy, for General Industrial Use.
  - 10). ASTM A1011: Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
  - 11). ASTM B633: Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
  - 12). ASTM E84: Test Method for Surface Burning Characteristics of Building Materials.
  - 13). ASTM E119: Method for Fire Tests of Building Construction and Materials.
  - 14). ASTM E814: Test Method of Fire Tests of Through-Penetration Firestops.
  - 15). ASTM F708: Standard Practice for Design and Installation of Rigid Pipe Hangers.
- d. American Welding Society
  - 1). AWS D1.1: Structural Welding Code - Steel.
- e. FM Global
  - 1). FM: Approval Guide, A Guide to Equipment, Materials & Services Approved by Factory Mutual Research for Property Conservation.
- f. Manufacturers Standardization Society of the Valve and Fittings Industry
  - 1). MSS SP-58: Pipe Hangers and Supports - Materials, Design and Manufacturer.
  - 2). MSS SP-69: Pipe Hangers and Supports - Selection and Application.
  - 3). MSS SP-77: Guidelines for Pipe Support Contractual Relationships.
  - 4). MSS SP-89: Pipe Hangers and Supports - Fabrication and Installation Practices.
  - 5). MSS SP-90: Guidelines on Terminology for Pipe Hangers and Supports.
- g. Sheet Metal and Air Conditioning Contractors National Association, Inc.
  - 1). SMACNA: HVAC Duct Construction Standards - Metal and Flexible.

1.4 SUBMITTALS

- A. Submittals shall be furnished in accordance with the requirements of Section 23 00 00.

1.5 WARRANTY

- A. Comply with Division 01 - General Requirements and Section 23 00 00 requirements for product warranties.
- B. Furnish a five- (5-) year manufacturer's warranty for all pipe hangers and supports.





- C. Warranty period shall initiate upon Final Acceptance by Owner.
- 1.6 COMMISSIONING
  - A. Provide all testing and commissioning as required. Obtain all commissioning requirements from the Commissioning Provider/Owner/Agent.

**PART 2 - PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURERS**

- A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical-characteristic requirements of the Construction Documents.
- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate, and must be accompanied by a Letter of Equivalency certifying the product's equivalency in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved, neither the project specifications nor the Construction Documents will be revised to reflect the substitution.
- C. Cable Support Systems for Ducts
  - 1. B Line Kwik Wire
  - 2. Duct Mate (Clutcher).
  - 3. Erico Caddy Speed Link.
  - 4. Gripple.
- D. Formed Steel Channel Supports
  - 1. Anvil International.
  - 2. Cooper B-Line/Eaton.
  - 3. Carpenter & Patterson.
  - 4. Empire Industries, Inc.
  - 5. Erico - Caddy.
  - 6. Hilti.
  - 7. Hydra-Zorb.
  - 8. National Pipe Hanger Corporation.
  - 9. PHS Industries, Inc.
  - 10. Piping Technology and Products.
  - 11. Thomas & Betts - Kindorf.
- E. Post-Installation Mechanical Anchors: NOTE: Powder- or power-actuated devices, grip nails and/or expansion nails are NOT permitted.
  - 1. Hilti.
  - 2. MKT Fastening, LLC.
  - 3. Powers Fasteners.
  - 4. Simpson Strong-Tie.
  - 5. Williams Form Engineering Corp.
- F. Pipe Anchors
  - 1. Amber Booth.
  - 2. Kinetics Noise Control, Inc.
  - 3. Mason Industries, Inc.
  - 4. Vibration Eliminator Co.
  - 5. Vibration Mountings and Controls.
- G. Pipe Guides
  - 1. Advanced Thermal Systems, Inc.
  - 2. Cooper Industries.



3. Erico.
  4. Flexicraft Industries.
  5. Flex-Weld Incorporated.
  6. Hyspan.
  7. Mason-Mercer.
  8. Metraflex.
  9. Piping Technology and Products.
  10. RSJK Inc.
  11. Spider Manufacturing Inc.
  12. Tri-State Industries.
  13. Vibration Mountings and Controls.
- H. Pipe Hangers and Supports
1. Anvil International.
  2. Cooper B-Line/Eaton.
  3. Carpenter & Patterson.
  4. Empire Industries, Inc.
  5. Erico - Caddy.
  6. Hilti.
  7. Hydra-Zorb.
  8. National Pipe Hanger Corporation.
  9. PHS Industries, Inc.
  10. Piping Technology and Products.
  11. Thomas & Betts - Kindorf.

## 2.2 GENERAL REQUIREMENTS

- A. Furnish and install pipe hangers and supports to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies.
- B. Comply with maximum load ratings with consideration for allowable stresses prescribed by ASME B31.1 or MSS SP-58.
- C. Provide supports, guides and anchors that do not transmit unacceptable heat and vibration to building structure.
- D. The support systems shall provide for, and control, the free or intended movement of the piping, including its movement in relation to that of connected equipment.
- E. In addition to the short-term frame-shortening anticipated during the initial construction period, all systems shall be installed with provisions to accommodate long-term frame-shortening equivalent to 1/16 inches (1.6 mm) per foot in addition to any expansion and/or contraction of the systems as a result of thermal changes.
- F. Provide for vertical adjustments after installation of supported material and during commissioning, where feasible, to ensure that pipe is at design elevation and slope.
- G. Select hangers and supports to perform under all conditions of operation, allowing free expansion and contraction, and to prevent excessive stresses being introduced into the piping system and connected equipment.
- H. Where supplemental steel is required to support services or equipment, the supplemental steel shall be designed to provide a maximum deflection of 1/360 at the midspan under the supported load. The services or equipment shall be isolated from the building structure by means of isolators as required by the various mounting types specified in Section 23 05 48.16 - Vibration Isolation for HVAC Piping, Ducts and Equipment.
- I. Where piping is required to be seismically restrained, the yoke on clevis hangers and/or roller hangers, shall be reinforced to prevent the yoke from deforming. In the case of clevis hangers providing nuts on the inside and outside of the threaded rod connecting the yoke and clevis is acceptable.



- J. Deflection of rod hangers resulting from horizontal movement of the piping system from cold to hot positions shall not to exceed 4 degrees from the vertical.
- K. The rods on all hangers shall be of adequate size to support the loads that they carry. The minimum size shall be 3/8 inch (10 mm).
- L. Coordinate with other trades to use common means of support. Submit for approval all pertinent design data relating to the support as well as verification of the responsibility for the support.
- M. All hangers and supports for equipment and components located outdoors must be connected to the building structure. Mountings shall be designed to resist wind loading as required under Section 23 05 00 - Common Work Results.
- N. Finishes
  - 1. Hangers and clamps for uninsulated copper pipes shall be coated with copper-colored epoxy paint and an additional PVC coating.
  - 2. Hangers, anchors, supports and guides (swivel ring, split ring, roller, wrought pipe clamp, or adjustable wrought clevis-type hangers, roller supports, floor stands, wall brackets, etc.) installed within the building shall be factory-finished with red oxide primer or electro-galvanized.
  - 3. Strut channels installed indoors shall be pre-galvanized in accordance with ASTM A653 SS Grade 33 G90.
  - 4. Hangers, anchors, supports, guides and struts located outdoors shall be hot-dip galvanized after fabrication in accordance with ASTM A123. All hanger hardware shall be hot-dip galvanized or stainless steel. Zinc-plated hardware is not acceptable for outdoor or corrosive use.
- O. All equipment and components located outdoors shall comply with wind-resistant construction requirement indicated in Section 23 05 00 - Common Work Results.

**PART 3 - EXECUTION**

**3.1 INSTALLATION OF PIPE HANGERS AND SUPPORTS**

- A. All attachments to the building structure shall comply with the requirements of 23 05 48.16 - Vibration Isolation for HVAC Piping, Ducts and Equipment.
- B. Provide suitable and substantial hangers and supports for all horizontal pipes. Hangers and supports shall be of the type, size and spacing specified, or as approved. All piping shall be carried by pipe hangers supported from building structure. Provide all the supplementary steel required to support, guide and anchor piping within shafts, Mechanical Equipment Rooms, roofs and all the other floors.
- C. Pipe hangers, anchors, supports and guides shall be manufactured, selected, fabricated and installed in accordance with MSS SP-58, MSS SP-69 and MSS SP-89.
- D. Horizontal piping shall be supported in accordance with the following schedules:

<b>SINGLE-ROD SUPPORT - STEEL PIPE</b>		
<b>Pipe Size</b>	<b>Maximum Hanger Spacing</b>	<b>Rod Size</b>
1-1/4 inches and smaller (35 mm and smaller)	6 feet 0 inches (1.8 meters)	3/8 inch (10 mm)
1-1/2 to 2 inches (38 mm to 50 mm)	9 feet 0 inches (2.5 meters)	3/8 inch (10 mm)
2-1/2 to 3 inches (65 mm to 75 mm)	10 feet 0 inches (3 meters)	1/2 inch (12.5 mm)
3-1/2 to 5 inches (90 mm to 125 mm)	12 feet 0 inches (3.5 meters)	5/8 inch (15 mm)



<b>SINGLE-ROD SUPPORT - STEEL PIPE</b>		
<b>Pipe Size</b>	<b>Maximum Hanger Spacing</b>	<b>Rod Size</b>
6 to 8 inches (150 mm to 200 mm)	14 feet 0 inches (4 meters)	3/4 inch (20 mm)
10 to 12 inches (255 mm to 305 mm)	16 feet 0 inches (5 meters)	7/8 inch (22 mm)
14 to 24 inches (355 mm to 610 mm)	20 feet 0 inches (6 meters)	1 inch (25 mm)

<b>DOUBLE-ROD SUPPORT</b>		
<b>Pipe Size</b>	<b>Maximum Hanger Spacing</b>	<b>Rod Size</b>
6 to 8 inches (150 mm to 200 mm)	14 feet 0 inches (4 meters)	1/2 inch (12.5 mm)
10 to 12 inches (255 mm to 305 mm)	16 feet 0 inches (5 meters)	5/8 inch (15 mm)
14 to 24 inches (355 mm to 610 mm)	20 feet 0 inches (6 meters)	3/4 inch (20 mm)

<b>SINGLE-ROD SUPPORT - COPPER PIPE</b>		
<b>Pipe Size</b>	<b>Maximum Hanger Spacing</b>	<b>Rod Size</b>
3/4 inch and smaller (20 mm and smaller)	5 feet 0 inches (1.5 meters)	3/8 inch (10 mm)
1 to 1-1/4 inches (25 mm to 35 mm)	7 feet 0 inches (2 meters)	3/8 inch (10 mm)
1-1/2 to 3 inches (38 mm to 75 mm)	8 feet 0 inches (2.5 meters)	1/2 inch (12.5 mm)
3-1/2 to 5 inches (90 mm to 125 mm)	12 feet 0 inches (3.5 meters)	1/2 inch (12.5 mm)
6 to 8 inches (150 mm to 200 mm)	12 feet 0 inches (3.5 meters)	3/4 inch (20 mm)

E. Horizontal piping shall be supported in accordance with the following schedules:

<b>SINGLE-ROD SUPPORT - STEEL PIPE</b>		
<b>Pipe Size</b>	<b>Maximum Hanger Spacing</b>	<b>Rod Size</b>
1-1/4 inches and smaller	6 feet 0 inches	3/8 inch
1-1/2 to 2 inches	9 feet 0 inches	3/8 inch
2-1/2 to 3 inches	10 feet 0 inches	1/2 inch
3-1/2 to 5 inches	12 feet 0 inches	5/8 inch
6 to 8 inches	12 feet 0 inches	3/4 inch
10 to 24 inches	12 feet 0 inches	7/8 inch

<b>DOUBLE-ROD SUPPORT</b>		
<b>Pipe Size</b>	<b>Maximum Hanger Spacing</b>	<b>Rod Size</b>
6 to 8 inches	12 feet 0 inches	1/2 inch



10 to 12 inches	12 feet 0 inches	5/8 inch
14 to 24 inches	12 feet 0 inches	3/4 inch

SINGLE-ROD SUPPORT - COPPER PIPE		
Pipe Size	Maximum Hanger Spacing	Rod Size
3/4 inch and smaller	5 feet 0 inches	3/8 inch
1 to 1-1/4 inches	7 feet 0 inches	3/8 inch
1-1/2 to 3 inches	8 feet 0 inches	1/2 inch
3-1/2 to 5 inches	12 feet 0 inches	1/2 inch
6 to 8 inches	12 feet 0 inches	3/4 inch

- F. Maximum hanger spacing may not be exceeded; however, actual installed spacing will depend on location of structural framing and floor slab construction. Where building construction does not permit the above spacing, provide additional steel supports.

3.2 INSTALLATION OF DUCT HANGERS AND SUPPORTS

- A. Rectangular and flat oval ductwork shall be supported in accordance with Table 5-1 and Figure 5-5, except that wire shall not be used and the maximum hanger spacing shall not exceed 8 feet (2.5 m).
- B. Round ducts shall be supported in accordance with Table 5-2 and Figure 5-5, except that wire shall not be used and the maximum hanger spacing shall not exceed 10 feet (3.5 m).
- C. If any duct has to be hung in space where no inserts have been provided, post-installation anchors shall be installed. The carrying capacity and size of each anchor shall be calculated on the basis of the spacing indicated within Table 5-1 and 5-2 of SMACNA - HVAC Duct Construction Standards - Metal and Flexible. The rods on all hangers shall be of adequate size to support the loads that they carry.
- D. Where the width of the duct exceeds 48 inches (1,290 mm), the hanger shall be bent under the bottom of ducts and fastened to the bottom as well as to the sides.
- E. Where ducts are stacked, they shall be independently supported as above. No ducts shall be hung from ducts. In no case shall hangers be supported by means of vertical expansion bolts.
- F. Additional hangers shall be provided for all acoustically lined double-wall ducts.
- G. Particular care shall be taken to support large and heavy ductwork in a manner approved by the Engineer, including the providing of supplemental steel, if required. Shop drawings indicating support methods, point loadings to the building structure, and hanger locations shall be submitted to the Structural Engineer for review sufficiently in advance of concrete pouring schedules to permit evaluation, critique and any necessary changes of hanging and support methods. If additional hangers, inserts and/or supplemental steel are required, such hangers, inserts and/or supplemental steel shall be provided at no additional cost to the Contract.
- H. Where horizontal ducts are required to be enclosed in drywall, etc., such enclosures shall not be supported from the duct hangers. Supports for such enclosures shall be provided by the trade responsible for the installation of those enclosures.

END OF SECTION 23 05 29



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Construction**

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SECTION 23 05 48.16

VIBRATION ISOLATION FOR HVAC PIPING, DUCTS AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide all vibration isolation devices for HVAC piping, ducts and equipment as indicated and scheduled on the Construction Drawings and in accordance with the Construction Documents.
- B. Section includes:
  - 1. Vibration isolation for piping, ductwork and equipment.
  - 2. Equipment isolation bases.

1.2 RELATED SECTIONS

- A. Refer to Divisions 01, 14, 21, 22, 26, 27 and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. Refer to Section 23 00 00.03 – Table of Contents for HVAC for specification sections that apply to all work herein.

1.3 REFERENCES

- A. Vibration isolation for HVAC piping, ducts and equipment shall be designed, manufactured and tested in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
  - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for New York City and New York State
    - a. Building Code of the State of New York.
    - b. Fire Code of the State of New York.
    - c. Mechanical Code of the State of New York.
    - d. Energy Conservation Construction Code of New York State.
    - e. New York City Building Code.
    - f. New York City Mechanical Code.
    - g. New York City Fuel Gas Code.
  - 2. Reference Standards: Perform all work in accordance with, but not limited to, the following standards:
    - a. American Welding Society
      - 1). AWS D1.1: Structural Welding Code - Steel.
    - b. ASTM International
      - 1). ASTM A90/A 90M: Test Method for Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
      - 2). ASTM A123/A123M: Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
      - 3). ASTM A153/A153M: Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Hardware.
    - c. Manufacturers Standardization Society of the Valve and Fittings Industry
      - 1). MSS SP-69: Pipe Hangers and Supports - Selection and Application.
      - 2). MSS SP-89: Pipe Hangers and Supports - Fabrication and Installation Practices.
      - 3). MSS SP-90: Guidelines on Terminology for Pipe Hangers and Supports.

1.4 SUBMITTALS

- A. Submittals shall be furnished in accordance with the requirements of Section 23 00 00.

1.5 WARRANTY

- A. Comply with Division 01 - General Requirements and Section 23 00 00 requirements for product warranties.



- B. Furnish a five- (5-) year manufacturer's warranty for all foundations and vibration isolators.
- C. Warranty period shall initiate upon Final Acceptance by Owner.

1.6 COMMISSIONING

- A. Provide all testing and commissioning as required. Obtain all commissioning requirements from the Commissioning Provider/Owner/Agent.

**PART 2 - PRODUCTS**

2.1 Acceptable Manufacturers

- A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical-characteristic requirements of the Construction Documents.
- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate, and must be accompanied by a Letter of Equivalency certifying the product's equivalency in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved, neither the project specifications nor the Construction Documents will be revised to reflect the substitution.
- C. Vibration Isolators
  - 1. Amber Booth.
  - 2. ISAT (International Seismic Application Technology).
  - 3. Kinetics Noise Control, Inc.
  - 4. Mason Industries, Inc.
  - 5. Vibration Eliminator Co.
  - 6. Vibration Mountings and Controls.

2.2 GENERAL REQUIREMENTS

- A. Furnish and install foundations and vibration isolators to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies.
- B. Foundations and vibration isolators shall not transmit unacceptable heat and vibration to building structure.
- C. Vibration isolators shall provide a minimum isolation efficiency of ninety percent (90%) at each of the following that apply:
  - 1. Fan rotor rpm with a maximum deflection of 2 inches (51 mm).
  - 2. Lowest disturbing frequency of pumps, compressors and suspended HVAC units with compressors.
  - 3. Fan rotor rpm of cooling towers and evaporative coolers with a maximum static deflection of 4 inches (100 mm).
- D. The vibration isolation systems shall be guaranteed to have the deflection indicated in the schedule on the drawings. Mounting systems and components of the isolation mounting shall not be resonant with any of the forcing frequencies of the supported equipment or piping. Mounting sizes shall be determined by the mounting manufacturer and mounting shall be installed in accordance with manufacturer's instructions.
- E. All floor-mounted equipment, including equipment mounted on vibration-eliminating devices and/or concrete inertia blocks, shall be erected on 4 inch (100 mm) high concrete pads over the complete area of the equipment, unless specified to the contrary herein.
- F. All roof-mounted equipment exposed to the wind, such as cooling towers, fans and air handling equipment, shall be mounted on spring mountings within a rigid sided housing that includes vertical limit stops to prevent spring extension when weight is removed and temporary steel spacers between the upper and lower housings. Housings shall serve as blocking during erection.
- G. All vibration isolators for equipment and components located outdoors must be connected to the





- building structure. Vibration isolators shall be designed to resist wind loading as required under Section 23 05 00 - Common Work Results.
- H. All mounting systems exposed to weather and other corrosive environments shall be protected with factory corrosion resistance. All metal parts of mountings (except springs and hardware) are to be hot-dip galvanized. Springs shall be cadmium-plated and neoprene-coated. Nuts and bolts shall be cadmium-plated.
  - I. Provide for vertical adjustments after installation of isolator material and during commissioning, where feasible, to ensure pipe is at design elevation and slope.
  - J. Where supplemental steel is required to support piping or equipment, the supplemental steel shall be designed to provide a maximum deflection of  $L/360$  at the midspan under the supported load. The piping or equipment shall be isolated from the building structure by means of isolators as required by the various mounting types specified for the piping and/or equipment.
  - K. Where steel spring isolation systems are described in the following specifications, the mounting assemblies shall utilize bare springs with the spring diameter not less than 0.8 of the loaded operating height of the spring. Each spring isolator shall be designed and installed so that the ends of the spring remain parallel. The spring shall be designed to provide an additional minimum travel distance of no less than 50% of the minimum deflection. The maximum motion of any resiliently supported equipment at startup or shutdown shall be 1/4 inch (6.35 mm). Approved lateral restraints shall be provided as required to limit motions in excess of 1/4 inch (6.35 mm).
  - L. Where neoprene-in-shear isolation systems are described in the following specifications, the mounting assemblies shall utilize bare neoprene elements with unit-type design molded in oil-resistant neoprene. The neoprene shall be compounded to meet the following:
    - 1. Not greater than 70 durometer.
    - 2. Minimum tensile strength of 2,000 psi (13,790 kPa).
    - 3. Minimum elongation of 300%.
    - 4. Maximum compression at 25% of original deflection.
  - M. Vibration isolation equipment submittal drawings shall include the following information:
    - 1. Isolation mounting deflections.
    - 2. Spring diameters, compressed spring heights at rated load; solid spring heights, where steel spring isolation mountings are used.
    - 3. Equipment operating speed.
    - 4. Maximum motion at fan flexible connections.
    - 5. Drawings, as required, to show the number and location of seismic restraints for each piece of equipment, specific details of restraints, including anchor bolts for mountings and maximum load (static plus dynamic) expected at each restraint or snubbing device and showing that fastening devices for the seismic restraints are capable of maintaining equipment in a captive position when subjected to external forces of 0.5 "g" in any direction.
  - N. During equipment installation, floor-supported spring isolation bases shall be set on 2 inch high spacers between the isolation base and the housekeeping pad. After all connections (pipe, duct and conduit) have been made to the equipment and the system has been filled, the normal operating equipment load shall be removed without change of equipment elevation or transfer of stress to the equipment.
  - O. Mountings incorporating vertical limit stops shall be furnished and installed with 1/4 inch spacers. The mounting shall serve as blocking during installation. Mountings shall be adjusted and spacers removed after equipment achieves normal operating loads.
  - P. Select vibration isolators to perform under all conditions of operation, allowing free expansion and contraction, and to prevent excessive stresses being introduced into the piping system and connected equipment.
  - Q. All vibration isolation devices and their components shall be the products of one of the manufacturers listed above.



- R. All equipment, piping, etc., shall be mounted on or suspended from approved foundations and supports as specified herein, as shown on the construction drawings, or as required.
- S. Furnish and install, as shown or as approved, all necessary supports for equipment furnished under this section. To meet varying conditions in each case, these supports shall consist of pipe stands, steel angle or strap hangers, saddles, brackets, etc., as shown, or as approved. All such supports shall have substantial flanges bolted to floor construction; hangers shall be supported from the framing as described hereinabove. Supports shall be properly located with reference to any supporting pads, legs, etc., of the equipment carried and must be of such number and so distributed as not to bring any undue strains to the equipment. All details shall be as approved.
- T. Provide suitable brackets, pipe stands, piers or other supports for all various float traps, receivers, etc. Also provide suitable supports for all tempering stacks, air filters, mixing and control dampers, etc., securely clamped to steel beams, columns or bearing walls. All details of this work shall be as shown on the drawings, or as approved.
- U. Coordinate manufactured vibration isolation devices with the requirements for seismic restraints as specified in other sections of these specifications and if applicable and at the contractor's convenience, provide vibration isolation devices, otherwise as specified in this section, with integral seismic restraint features as applicable and in accordance with requirements for seismic restraints.
- V. Guarantee that the work, as installed under this section of the specifications, will not result in the transmission of objectionable noise or vibration to any occupied parts of the building, and take full responsibility for any necessary modifications of this equipment, or of the foundations and supports for the same, necessary to secure this result. Provide, as shown or as approved, all necessary supports for equipment furnished under this section. To meet varying conditions in each case, these supports shall consist of pipe stands, steel angle or strap hangers, saddles, brackets, etc., as shown or as approved. All such supports shall have substantial flanges bolted to floor construction; hangers shall be supported from the framing as described hereinabove. Supports shall be properly located with reference to any supporting pads, legs, etc., of the equipment carried and must be of such number and so distributed as not to bring any undue strains upon the equipment. All details shall be as approved.
- W. Provide suitable brackets, pipe stands, piers or other supports for all various float traps, receivers, etc. Also provide suitable supports for all tempering stacks, air filters, mixing and control dampers, etc., securely clamped to steel beams, columns or bearing walls. All details of this work shall be as shown on the drawings, or as approved.
- X. All equipment and components located outdoors shall comply with wind-resistant construction requirement indicated in Section 23 05 00 - Common Work Results.

### 2.3 FOUNDATIONS AND VIBRATION ISOLATION

- A. All concrete foundations and supports and required reinforcing therefor shall be furnished and installed as work under another division. However, this Contractor shall furnish shop drawings showing adequate concrete-reinforcing steel details and templates for all concrete foundations and supports, and all required hanger bolts and other appurtenances necessary for the proper installation of his equipment. Although the Construction Manager/General Contractor shall complete all concrete work, all such work shall be shown in detail on the shop drawings, which drawings shall be submitted to the Architect showing the complete details of all foundations, including the necessary concrete and steel work, vibration isolation devices, etc.
- B. The following manufacturers and their products are listed to provide a reference as to the type of vibration control devices to be used in each application.
  - 1. Mason Industries, Inc., Hauppauge, New York (M.I.I.)
  - 2. Vibration Eliminator Company, Long Island City, New York (V.E.C.)
  - 3. Vibration Mountings & Controls, Inc., Bloomingdale, New Jersey (V.M.C.I.)



- C. Mounting of Factory-Assembled Fans and Axial Flow Fans - Mounting Type V
  - 1. This equipment shall be mounted directly on stable bare steel spring isolators, except that, where the units to be mounted are furnished with internal structural frames and external lugs (both of suitable strength and rigidity) or without any severe overhangs, no additional structural frame need be provided beneath the unit. In any event, the motor shall be integrally mounted to the unit and shall be mounted on slide rails.
  - 2. Isolator types shall be one of the following, or as approved:
    - a. Type SLF - M.I.I.
    - b. Type OST - V.E.C.
    - c. Type ACB - V.M.C.I.
- D. Mounting of Ceiling-Supported Factory-Assembled Fans, Axial
- E. Mounting of Ceiling-Supported Factory-Assembled Fans, Axial Flow Fans, Tubular Fans and Belted Vent Sets - Mounting Type VII
  - 1. This equipment shall be mounted exactly as described under Mounting Type VI except that mountings shall be one of the following, or as approved:
    - a. Type HD - M.I.I.
    - b. Type RHD - V.M.C.I.
    - c. Type 3CTD - V.E.C.
  - 2. Diagonal hanger rod isolators shall be provided as required to limit horizontal motion to 1/4 inch maximum under fan operating conditions.
- F. Mounting of Centrifugal Pumps (Greater Than 3 hp [2.24 kW]) - Mounting Type VIII
  - 1. Each pump, with its driving motor, shall be bolted and grouted to a spring-supported concrete inertia base, reinforced as required.
  - 2. Each concrete base (rectangular or "T" shape) for horizontally split pumps shall include supports and base elbows for the suction and discharge connections. Base elbows shall be bolted and grouted to the concrete foundation.
  - 3. Reinforced concrete inertia base thickness shall be in accordance with the following schedule:
 

<b>Motor Size</b>	<b>Inertia Block Thickness Required</b>
5 hp to 15 hp	6 inches (152 mm)
20 hp to 50 hp	8 inches (203 mm)
60 hp to 100 hp	10 inches (250 mm)
Greater than 100 hp	12 inches (300 mm)
  - 4. The spring-supported reinforced-concrete inertia foundation shall be poured within a structural perimeter frame of the required thickness indicated in the above schedule. The structural perimeter frame shall be equipped with height-saving brackets and stable bare spring isolators having spring diameters no less than 0.8 of the compressed height of the spring at rated load. The mountings shall provide minimum static deflection of 1 inch (25 mm) unless otherwise noted on the drawings. Structural perimeter frame, mounting templates, saving brackets and spring system shall be provided as an assembly by the vibration control vendor. There shall be a minimum of 2 inches (50 mm) operating clearance between the pump inertia base and the foundation pad.
  - 5. Vertical piping loads, including water, strainers, and valves between the pump base elbow supports and the suction and discharge header piping, shall be supported by the pump base spring isolators without stress or strain to the pump casing.
  - 6. Provide suitable and adequate space between suction and discharge valves and the pump to permit future installation of flexible stainless steel braided metal hose connectors capable of accepting the operating working pressures with a burst pressure of not less than four (4) times the operating pressure.



7. Mounting assemblies shall be one of the following, or as approved:
  - a. Type KSL - M.I.I.
  - b. Type ASSB - V.M.C.I.
  - c. Type SN-OSK - V.E.C.
- G. Mounting of Refrigeration Machines, Roof top Air Conditioning Units- Mounting Type X
  1. This equipment shall be provided with a unitized one-piece steel rigid structural frame which shall be installed on spring-supported mountings. Each spring mounting shall be bare and stable and shall provide a minimum static deflection of 2 inches (50 mm). All spring mountings shall incorporate a leveling device, neoprene acoustical pad, and built-in vertical stop to prevent spring extension when equipment is removed from the base or the cooler and condensers are drained. Mountings shall be one of the following, or as approved:
    - a. Type SLR - M.I.I.
    - b. Type AWR - V.M.C.I.
    - c. Type KW - V.E.C.

### PART 3 - EXECUTION

#### 3.1 FINAL ADJUSTMENT

- A. When the equipment is at full operating weight, the springs shall be adjusted to assume the weight and the spacers removed, without changing the installed and operating heights.
- B. Hangers at equipment shall be adjusted to ensure that there are no loads imposed on the equipment by the piping connected to the equipment.
- C. Adjust hangers and supports to equalize loads and to ensure that rods are vertical under operating conditions.

END OF SECTION 23 05 48.16



SECTION 23 05 53

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Provide all identification systems for HVAC piping ducts and equipment as indicated and scheduled on the drawings and in accordance with the Construction Documents.
- B. Section includes:
  - 1. Equipment labels.
  - 2. Tags.
  - 3. Stencils.
  - 4. Pipe markers.
  - 5. Labels.
  - 6. Lockout devices.

**1.2 RELATED SECTIONS**

- A. Refer to Divisions 01, 14, 21, 22, 26, 27 and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. Refer to Section 23 00 00.03 – Table of Contents for HVAC for specification sections that apply to all work herein.

**1.3 REFERENCES**

- A. Equipment labels, tags, pipe markers, labels and their components shall be designed, manufactured and tested in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
  - 1. Codes: Perform all work in accordance with the latest applicable codes and standards for New York City and New York State.
    - a. Building Code of the State of New York.
    - b. Fire Code of the State of New York.
    - c. Mechanical Code of the State of New York.
    - d. Energy Conservation Construction Code of New York State.
    - e. New York City Building Code.
    - f. New York City Mechanical Code.
  - 2. Reference Standards: Perform work in accordance with, but not limited to, the following standards:
    - a. American Society of Mechanical Engineers
      - 1). ASME A13.1: Scheme for the Identification of Piping Systems.
    - b. American National Standards Institute
      - 1). ANSI Z535: Safety Color Code - Environmental Facility Safety Signs - Criteria for Safety Symbols - Product Safety Sign & Labels - Accident Prevention Tags.
    - c. ASTM International
      - 1). ASTM D 882: Standard Test Method for Tensile Properties of Thin Plastic Sheeting.

**1.4 SUBMITTALS**

- A. Submittals shall be furnished in accordance with the requirements of Section 23 00 00.

**1.5 WARRANTY**

- A. Comply with Division 01 - General Requirements and Section 23 00 00 requirements for product warranties.
- B. Furnish a one- (1-) year manufacturer's warranty against manufacturing defects for all systems and components.



- C. Warranty period shall initiate upon Final Acceptance by Owner.
- 1.6 COMMISSIONING
  - A. Provide all testing and commissioning as required. Obtain all commissioning requirements from the Commissioning Provider/Owner/Agent.

## PART 2 - PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURERS

- A. Being listed herein as an acceptable manufacturer does not permit the manufacturer to provide standard manufactured equipment that does not comply with the performance and/or physical-characteristic requirements of the Construction Documents.
- B. All substitutions must be identified in the Base Bid as a voluntary Deduct Alternate, and must be accompanied by a Letter of Equivalency certifying that the products are equivalent in all performance and physical characteristics to the products listed herein. The proposed substitutions shall be inclusive of all cost and physical implications throughout the project. Under no circumstances should the substitution result in added cost to the project. Should the substitution be approved, neither the project specifications nor the Construction Documents will be revised to reflect the substitution.
- C. Equipment Labels
  - 1. Brady Corporation.
  - 2. Brimar Industries Incorporated.
  - 3. Marking Services Incorporated.
  - 4. Seton Nameplate Corp.
- D. Pipe Markers and Underground Warning Tape
  - 1. Brady Corporation.
  - 2. Brimar Industries Incorporated.
  - 3. Marking Services Incorporated.
  - 4. Seton Nameplate Corp.
- E. Tags
  - 1. Brady Corporation.
  - 2. Brimar Industries Incorporated.
  - 3. Marking Services Incorporated.
  - 4. Seton Nameplate Corp.

### 2.2 GENERAL REQUIREMENTS

- A. Equipment Labels: Label nomenclature shall correspond to the system identification listed in the schedules on the Contract Drawings and/or "Record Drawings". The labels shall conform to the following:
  - 1. Labels for equipment located within the building shall be made of laminated three-layer matte-finish flexible acrylic sheet, with cap and core permanently fused together to form a break-resistant, stain-resistant, chip-proof and shatterproof product with black-surface and white-core engraved letters and numbers. Each nameplate shall be a minimum of 3 inches (75 mm) long by 1 inch (25 mm) wide with 1/4 inch (5 mm) high letters. Labels shall have contact-type permanent adhesive backing and be pre-drilled or punched for attachment.
  - 2. Labels on equipment outside of the building shall be 20 mil (0.5 mm) black enameled aluminum of varying lengths but no less than 3 inches (75 mm) long by 1 inch (25 mm) wide with 1/4 inch (5 mm) high letters. Labels shall be pre-drilled or punched for attachment.
- B. Identification of Access Doors
  - 1. Access doors for fire dampers, smoke dampers and fire/smoke dampers shall be labeled on the outside by a label having letters no less than 0.5 inches (12.7 mm) in height reading: FIRE DAMPER, SMOKE DAMPER OR FIRE SMOKE DAMPER, followed by an



- identification marking that is individual and unique to the damper being accessed.
- C. Pipe Markers: These shall meet ANSI/OSHA requirements for identifying the service, direction of flow, system and zone, for the various piping systems.
1. They shall be factory-fabricated, flexible, semi-rigid UV-resistant heavy-duty vinyl, preformed to fit around pipe or pipe covering. Larger sizes may have maximum sheet size with spring fastener.
  2. Each marker shall consist of one (1) label with direction-of-flow arrows and the name of the service printed in black letters not less than 1 inch (25 mm) high for pipe 2-1/2 inches (60 mm) and smaller, 2 inch (50 mm) high for pipe 3 inches (75 mm) and larger. Markers shall have backgrounds of different colors for the various service groups.
- D. Tags for Valves, Dampers and Controls: These shall have distinguishing letters and numbers corresponding to those on the charts, floor plans and flow diagrams and shall conform to the following:
1. Tags for valves, dampers, and controls located within the building shall be made of laminated three-layer matte-finish flexible acrylic sheet, with cap and core permanently fused together to form a break-resistant, stain-resistant, chip-proof and shatterproof product. Following are the requirements for the size and shape of the tags as well as an outline of the recommended nomenclature:
    - a. Chilled Water Systems: 2 inch (50 mm) round blue tags with white lettering labeled CHWS or CHWR, with identifying numbers.
    - b. Hot Water Heating Systems: 2 inch (50 mm) octagonal red tags with white lettering labeled HTGS or HTGR, with identifying numbers.
    - c. Pumped Condensate: 2 inch (50 mm) square yellow tags labeled PCOND, with identifying black numbers.
  2. The exact nomenclature used on the tags shall be submitted to the Consulting Engineer and Owner's representative for approval.

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Prepare surfaces in accordance with Section 09 90 00 for stencil painting.
- B. Complete touch-up painting; prepare surfaces in accordance with Section 09 90 00.
- C. Complete the installation of all insulation and coverings.
- D. Remove all dust and dirt and degrease and clean surfaces to receive adhesive for identification materials.

#### 3.2 INSTALLATION

- A. Furnish and install equipment identification labels as specified herein for all equipment scheduled on the Contract Drawings, i.e., air handling units, pumps, heat transfer equipment, tanks, control panels, water treatment devices, etc. Identify in-line pumps and other small devices with tags.
  1. Labels shall be secured with adhesive and corrosive-resistant fasteners.
- B. Utilize stencils to identify all air handling units, supply fans, return fans, exhaust fans, ducts, etc., using the system designations and areas served listed in the schedules. Locate identification at piece of equipment, on each side of penetration of structure or enclosure, and at each obstruction.
  1. Stencil identification labels on all concealed and exposed ducts, including shafts. Stencil each duct where it can be easily read and with the long dimension parallel to the axis of the duct.
- C. Provide the following project record documents:
  1. Record actual locations of tagged valves; include valve tag numbers.
  2. Provide three (3) sets of charts and diagrams showing outline plans of structures and essential features of each system, including all piping, ducts, equipment, valves, dampers and controls.



3. Furnish three (3) complete sets of valve and/or damper schedules and schematic flow diagrams with corresponding numbers noted thereon indicating location of device by floor and nearest column number. Schedules shall also show the valve or damper size, service, function, valve manufacturer's name and model number.
4. Provide three (3) complete sets of control device schedules and schematic flow diagrams with corresponding numbers noted thereon, indicating location of each device by floor and nearest column number. Schedules shall also show the type of control device, function, manufacturer's name and model number.
5. Schedules shall be mounted in heavy-duty polypropylene protective sheets in 8-1/2 x 11 inch (215 x 280 mm) three-ring binders.
6. Reproducible drawings, schedules and flow diagrams shall also be provided to the Owner for his use.

END OF SECTION 23 05 53





SECTION 23 05 93

TESTING, ADJUSTING AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes providing all labor, material, equipment, instruments, tools and services required to complete the testing, adjusting and balancing of all systems as described in the specifications and/or listed in the schedules on the Contract Documents. The systems included are as follows:
1. Air conditioning systems, including constant volume regulators (CVR's), variable air volume regulators (VAV's), fan-powered boxes (FPB's), air columns, air distribution devices, supply ducts and return ducts, control dampers (minimum and variable outdoor air dampers and return air dampers), grilles, registers and diffusers.
  2. Heating and ventilating systems, including air distribution devices and supply ducts.
  3. Stair and/or elevator pressurization systems, including pressure relief dampers.
  4. Return fan systems, including grilles, registers and return ducts.
  5. Exhaust fan systems, including CVR's, VAV's, grilles, registers and exhaust ducts.
  6. Computer room air conditioning (CRAC) units.
  7. Air distribution devices.
  8. Supply ducts.
  9. Condensing units.
  10. All hydronic systems, steam, steam condensate systems and fuel oil systems, including pumps, chillers, boilers, heat exchangers, cooling and heating coils, cooling towers, condensers, balancing valves, control valves and distribution piping.

1.2 RELATED SECTIONS

- A. Refer to Divisions 01, 14, 21, 22, 26, 27 and 28 for the scope of work furnished and installed under those divisions on which work in this division may be dependent.
- B. Refer to Section 23 00 00.03 – Table of Contents for HVAC for specification sections that apply to all work herein.

1.3 REFERENCES

- A. All testing, adjusting and balancing shall be performed in accordance with the latest applicable codes and reference standards including, but not limited to, the following:
1. Codes: Perform all work in accordance with the latest applicable codes and standards for New York City and New York State.
    - a. Building Code of the State of New York.
    - b. Fire Code of the State of New York.
    - c. Mechanical Code of the State of New York.
    - d. Energy Conservation Code of the State of New York
    - e. New York City Building Code.
    - f. New York City Energy Conservation Code
    - g. New York City Mechanical Code.
  2. Reference Standards: Perform all work in accordance with, but not limited to, the following standards:
    - a. Associated Air Balancing Council (AABC)
      - 1). AABC: National Standards for Total System Balance.
      - 2). AABC: Test and Balancing Procedures.
    - b. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
      - 1). ASHRAE 111: Practices for Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems.



- c. American Society of Mechanical Engineers
  - 1). ASME B31.9: Building Services Piping.
  - 2). ASME N510: Testing of Nuclear Air-Treatment Systems.
- d. National Environmental Balancing Bureau (NEBB)
  - 1). NEBB: Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems.
  - 2). NEBB: Procedural Standards for Certified Testing of Clean Rooms.
  - 3). NEBB: Procedural Standards for Fume Hood Performance Testing.
  - 4). NEBB: Procedural Standards for Retro-Commissioning of Existing Buildings.
  - 5). NEBB: Procedural Standards for Whole Building Systems Commissioning of New Construction.
- e. NSF International (NSF)
  - 1). NSF/ANSI 49: Biosafety Cabinetry: Design, Construction, Performance and Field Certification.
- f. Scientific Apparatus Makers Association (SAMA)
  - 1). Standard for Laboratory Fume Hoods.
- g. Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMACNA)
  - 1). SMACNA: HVAC Systems Testing, Adjusting and Balancing.
  - 2). SMACNA: HVAC Duct Systems Inspection Guide.
- h. Testing, Adjusting and Balancing Bureau (TABB)
  - 1). TABB: International Standards for Environmental Systems Balance.

1.4 SUBMITTALS

- A. The following submittal data shall be furnished according to the conditions of the Contract, Division 01, and Section 23 00 00

1.5 WARRANTY

- A. Comply with Division 01 - General Requirements and Section 23 00 00.

1.6 FINAL ACCEPTANCE

- A. The Owner and/or the Owner's representative shall make final check of all systems only after the balancing agency has completed and returned to the Owner or Owner's representative all recorded test data, together with a letter that the work is, to the best of the agency's knowledge, 100% complete. Field performance tests shall be required by the Owner and/or the Owner's representative at this time to verify performance and workmanship, and to make final system component adjustments.
- B. Points and areas for recheck shall be selected by the Owner's representative.
- C. Measurements and tests shall be the same as the original test-and-balance procedures.

1.7 COMMISSIONING

- A. Provide all testing and commissioning as required. Obtain all commissioning requirements from the Commissioning Provider/Owner/Agent.

**PART 2 - PRODUCTS**

2.1 INSTRUMENTATION

- A. Provide all necessary instruments as outlined in the following publications:
  - 1. AABC: National Standards for Total System Balance.
  - 2. ASHRAE 111: Practices for Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems.
  - 3. NEBB: Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems.
  - 4. TABB: Schedules in the International Standards for Environmental Systems Balance.



- B. All instruments used must carry a current certificate of calibration and must be listed in the testing and balancing reports showing instrument description, serial number and date of calibration. Calibration date must meet requirements set forth by NEBB: Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems.
- C. The accuracy of instruments used must be as required by current AABC, NEBB or TABB national standards.

### **PART 3 - EXECUTION**

#### **3.1 LEAK TESTING AIR SYSTEMS**

- A. Duct and plenum systems shall be leak pressure-tested in accordance with the procedure outlined in SMACNA-HVAC Air Duct Leakage Test Manual at the specified test pressures and leakage classes indicated in this specification.

#### **3.2 LEAK TESTING OF PIPING SYSTEMS**

- A. All steam, steam condensate and/or hydronic piping systems shall be hydrostatically tested; pneumatic testing is not acceptable.
- B. Hydrostatic pressure tests for water and steam piping systems shall include the respective equipment (including valves, strainers, etc.) unless the test pressure exceeds the manufacturer's maximum allowable test pressure as obtained by the Mechanical Contractor.
- C. All required leak testing shall be completed prior to the application of insulation.
- D. Each hydronic piping system shall be subjected to a hydrostatic pressure at least 1-1/2 times the maximum operating pressure (but not less than 100 psi) for a sufficiently long time, a minimum four (4) hours to detect all leaks and defects and, after testing, shall be made tight in an approved manner.

#### **3.3 BALANCING TOLERANCES**

- A. All equipment shall be adjusted in accordance with the capacities shown on the Contract Documents within the following permissible tolerances:
  - 1. Supply fans + 10% - 5%
  - 2. Supply grilles and diffusers ± 5%
  - 3. Return and exhaust fans + 10% - 5%
  - 4. Return registers and grilles ± 5%
  - 5. Exhaust registers and grilles ± 5%
  - 6. Flow to cooling equipment and cooling coils + 10% - 5%
- B. Hydronic systems and terminal devices shall be adjusted to within plus 10% or minus 5% of the design flow rates.

#### **3.4 REPORTS AND FORMS**

- A. Submit daily progress reports of test and balance work indicating any problem areas. Copies of deficiencies shall be transmitted to the Construction Manager/General Contractor and the Owner.
- B. Submit single-line diagrams of all duct systems indicating all terminal outlets and terminal boxes identified by number.

#### **3.5 ADJUSTING - GENERAL**

- A. Make all required adjustments to balancing valves, air vents, pumps, air dampers, registers, variable air volume boxes, fans, heat exchangers, humidifiers, etc., in the Owner's presence until all performance requirements are met.
- B. Unless otherwise specified, equipment shall be adjusted in accordance with manufacturers' recommendations to function properly with capacities required and/or specified.
- C. Preliminary balancing may be performed prior to completion of systems; however, final balancing must be done with systems completely installed and operational.
- D. All fan systems and hydronic pumping systems shall be operated for as long a time as necessary to test flow rates and make all necessary damper, valve and other adjustments, until the quantities required at each outlet and/or inlet, coil and heat exchanger throughout the various systems.